26076

HANDBOOK OF FIREPROOF CONSTRUCTION

CECO FIREPROOFING MATERIALS

260-6

MEYER STEELFORM CONSTRUCTION

CONCRETE ENGINEERING CO.

OMAHA.

HANDBOOK of FIREPROOF CONSTRUCTION

This Handbook is issued to familiarize the engineer, architect and builder with the many advantages of Meyer Steelform Construction and Ceco Fireproofing Materials.

Meyer Steelform Construction is a standard system of concrete floor construction in present day use by prominent architects, engineers and contractors in important structures throughout the country.

Ceco Fireproofing Materials are manufactured in styles approved by the leading architects and engineers. Utmost economy and quality in both materials and the subsequent erection has been the thought foremost in the minds of the designers.

This Handbook is therefore in every respect a Handbook of Fireproof Construction. We have endeavored to make it complete, explaining in detail the economy, efficiency, accuracy and adaptability of Meyer Steelform Construction and Ceco Fireproofing Materials.

Your attention is invited to the co-operative service maintained by our Engineering and Contract Departments and the opportunity to serve you is solicited.

CONCRETE ENGINEERING CO.
OMAHA

"MAXIMUM ENGINEERING SERVICE"

To render service is to do for your fellow man all that you would do for yourself in similar circumstances, with all possible enthusiasm, honor and efficiency. It is like the building of a monument that will forever withstand the test of time.

It is possible to render such service in the designing and erection of the modern fireproof structure, that the individual interests of architect, owner and contractor are each served to the greatest extent.

This is "Maximum Engineering Service."

MEYER STEELFORM CONSTRUCTION

PATENTED

INTRODUCTION

THE development and use of reinforced concrete in every type of fireproof structure has been so rapid and extensive, and its many advantages are so generally recognized, that it requires no detailed description or explanation. It will suffice to say that no other building material, or combination of materials, possesses the advantages of low initial and maintenance costs, quick erection, architectural adaptability, fireproofness and permanence, in the same degree as reinforced concrete.

There are various types of concrete design which have been adopted as standard, all of which admirably serve their purpose. It is the function of this Handbook to present to the reader the superior features of economy and quality found in the design of the reinforced concrete joist floor and in Meyer Steelform Construction.

The economy of the reinforced concrete joist floor is easily understood by comparing it with the wood joist floor. For ordinary conditions of loading, no type of wood floor has ever been developed which is more economical than the wood joist floor. The same economy of materials and labor is found in the design of reinforced concrete floors using joists at stated intervals for carrying the load. Its economy is more apparent in the longer spans, and in such structures as schools, apartments, hotels, office buildings, warehouses, garages, store buildings, etc., it is by far the most satisfactory and economical. Less concrete and steel are required to carry the given load with this type of floor design, and with the deep ribs or joists of concrete tying the structure together it is very desirable for buildings having moving or vibrating loads.

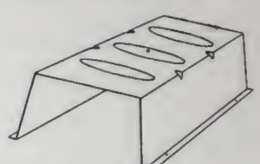
After this economy in materials required for the reinforced concrete joist floor had been well established, the next development toward economy occurred in the form work. Considering the fact that the average cost of the form work is approximately one third of the total cost of the concrete work, and that there is but little salvage in a large portion of the form work after the completion of the building, it is the most logical place to introduce economy. Economy in form work is in exact ratio with the re-use obtained, and it is now generally acknowledged that the use of a permanent equipment of removable steel forms in standard sizes effects the greatest possible economy.

It is therefore evident, that the economy of Meyer Steelform Construction lies in the minimum of materials required for the concrete joist floor, and in the removal and re-use features of Meyer removable Steelforms.

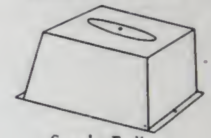
DESCRIPTION

In building the form work for the concrete joist floor, Meyer Steelforms are used as a mold for the joists and the intervening slab, the load being carried by the joists in one direction to the supports. Continuous joists are produced by lapping the Steelforms, and the ends of the rows of Steelforms are closed with Endforms.

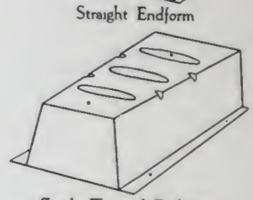
Intermediate Steelforms have depressed ribs in the top surface, thus securing the necessary rigidity to withstand the heavy trucking loads and weights which occur during construction. Being made of 16 gauge sheet steel, and formed into exact shape by heavy presses, they are absolutely rigid. The lower flanges are provided with nail holes so that the Steelforms can be accurately and firmly placed in position on the centering. 3-16″ round openings are placed in the center of the top surface of each Intermediate Steelform to permit placing ceiling hangers in the slab above each Steelform. (See details on page 7.)



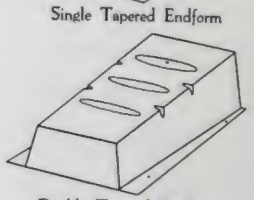
Intermediate Steelform



Straight Endform

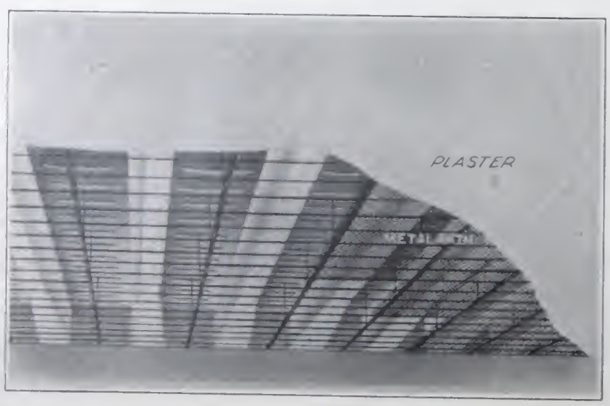


Single Tapered Endform



Double Tapered Endform

Endforms are of three types—Straight, Single Tapered and Double Tapered. They are all used to close the rows of Intermediate Steelforms, the Straight Endforms being used only where the load is such that the same width of joist can be maintained throughout the span between supports. Single Tapered Endforms effect an increase in the width of the joist as it approaches the support, thus providing the necessary concrete where the shear is greatest and where it is needed for negative compression at the support. Double Tapered Endforms, in addition to increasing the width of the joist, also increase the depth of the compression flange or tee of the supporting beam or girder, without increasing the area of concrete below the neutral axis, where it is useless. The supporting flanges of both the Single Tapered and Double Tapered Endforms, are of the same width as the flanges of the Intermediate Steelforms, so that it is not necessary to provide extra centering to take care of the increase in the width of the joists. Tapered Endforms are very effective in producing economy in connection with long spans and heavy loads, strengthening the construction very effectively in shear and negative compression. They are an economical feature obtained only through the use of Meyer Steelform Construction. (See details on page 7.)



Ceiling Construction: Our lath ceiling constructions involve the use of galvanized wire hangers, channel iron, 1/4″ round steel pencil rods and lath. Complete details and specifications are shown on pages 7 and 8. Reference to these details will convince the reader of the great strength and permanency of the standard ceiling constructions. The weight of several men may easily be sustained by the carrying or furring channels. The ceilings, erected after the removal of the Steelforms, may be attached directly to the concrete joists or suspended. When plastered, this effects the very desirable, hollow, soundproof floor, the air chambers between the joists and ceiling making a perfect insulation.

ADVANTAGES


Six Men on One Meyer Steelform

ACCURACY: Meyer Steelforms are so solidly rigid that absolute accuracy of concrete work is assured. Clean cut concrete joists are a certainty, and the lath ceiling is often omitted. The open concrete joist ceilings thus effected are very economical and satisfactory for use in Garages, Warehouses, Loft Buildings, etc. Reinforcing bars are securely held in their proper position by the use of Ceco Bar Chairs. There is no sagging of bars and no danger of incorrect placing of reinforcement. The erection of the ceiling construction after the removal of the Steelforms permits a thorough inspection of the concrete work before plastering.

EFFICIENCY: The solid rigidity of Meyer Steelforms permits their early removal and speedy re-use in the succeeding floors of any building. Sufficient equipment is furnished to the job to maintain the desired speed of erection. The Steelforms are removed and re-used as the contractor knocks down and erects his wood form work beneath, temporary shores being erected at the bottom of the joists, thus affording the necessary support until the concrete has sufficiently set up. Steady progress is made through the job and the best possible results may be obtained in the organization of labor. A desirable feature in connection with pouring concrete during cold weather, is that the heat from salamanders may be transmitted through the Steelforms directly to the concrete.

ECONOMY: As previously explained, the design of reinforced concrete joist floor used with Meyer Steelform Construction requires a minimum of concrete and steel. Concrete and steel are used only where they are effective in resisting stresses,—all non-carrying concrete is eliminated. The spacing of joists being a maximum, the full benefit of the tee section is obtained with a minimum of material. It is used with equal economy in connection with the concrete frame or steel frame building, and effects enormous savings in dead load with consequent savings in the carrying members of the building in comparison with the clay tile concrete joist floor and other types of construction.


Meyer Steelforms in Place


Open Concrete Joist Ceiling

The great rigidity of Meyer Steelforms permits the use of a simple and inexpensive system of open wood centering, details of which are shown on page 8. Lines of centering are provided only beneath the joists, the intervening space being left open, thus effecting a very decided saving in the cost of the form work over other types of floor construction.

With the minimum of materials required with Meyer Steelform Construction, the labor costs are obviously reduced.

And as economy in form work is in proportion to the re-use obtained, the economy effected through the removal and re-use of Meyer Steelforms is easily appreciated. The Steelforms are offered to the builder on a rental basis, thereby eliminating his investment expense.

SERVICE

ENGINEERING DEPARTMENT: The function of this Department is to prepare the most economical design for any type of reinforced concrete structure. The most economical construction is always used, the only exception being when the owner or builder prefers some other design. Any type of design can be prepared, and photographs showing buildings in which the Engineering Department have used flat slab and beam and girder designs, are shown on page 19. Complete details, drawings and specifications of concrete construction are furnished, the drawings showing clearly the exact location of the reinforcement and detailed sizes of all concrete work. Recommendations, estimates, preliminary layouts, etc., of all types of concrete construction, are a part of the service and incur no obligation.

CONTRACT DEPARTMENT: This Department handles the labor of erection or installation, on the job, placing and removing Meyer Steelforms (on open wood centering erected in place by others), furnishing, fabricating and placing reinforcing steel and column spirals. The field organization consists of foremen who are thoroughly familiar with this class of work, and entirely competent. The work is executed under their supervision and exactly in accordance with the drawings prepared by our Engineering Department and approved by the architect or engineer in charge.

The Lathing Division of the Contract Department, furnishes and erects metal lath furring of every description, ceilings, partitions, corner beads, base beads, metal picture moulding, etc. Special attention is paid to difficult ornamental furring.

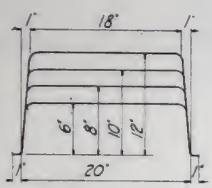
Complete stocks of reinforcing and fireproofing materials are carried in our several warehouses. Our fabricating facilities are the best, and immediate shipments can be made from stock.

Placing Meyer Steelforms

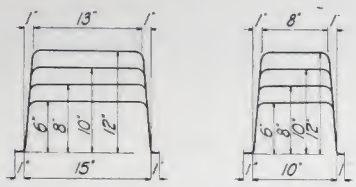
Erecting Lath Ceiling

SIZES OF MEYER STEELFORMS

INTERMEDIATES



Standard



Special

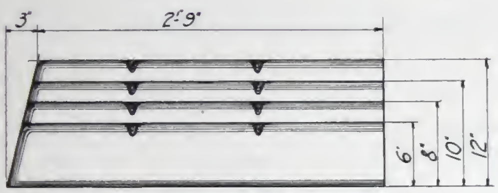
Standard intermediates furnished in 1, 2 and 3 foot lengths.

Special intermediates furnished only in 3 foot lengths.

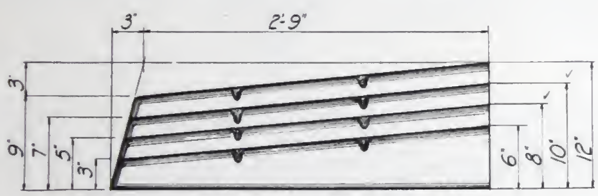
Straight endforms furnished only in 1 foot lengths, 10, 15 and 20 inches wide.

Tapered endforms furnished only in 3 foot lengths, 20 inches wide at open end.

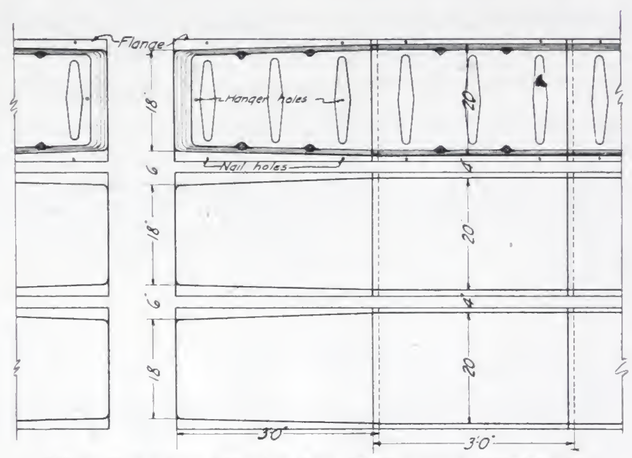
TAPERED ENDFORMS



Single Tapered Endforms



Double Tapered Endforms



Plan Showing Application of Tapered Endforms

SPECIFICATIONS

FLOOR CONSTRUCTION (See Details on Page Eight)

The floor construction in general to be Meyer Steelform Construction, in accordance with the design and practice of the Concrete Engineering Company, Omaha, Nebraska. This construction involves the use of removable Steelforms in the floor slabs, forming a slab and joist construction, the Steelforms to be placed upon open wood centering. Steelforms shall remain in place for a period of seven days after the pouring of concrete, and shall be removed only upon notification of the architect or engineer. Severe weather conditions may necessitate leaving the Steelforms in place for a longer period of time. Temporary braces, or supports, shall be erected after the removal of Steelforms to properly support the floor construction until the concrete has thoroughly set.

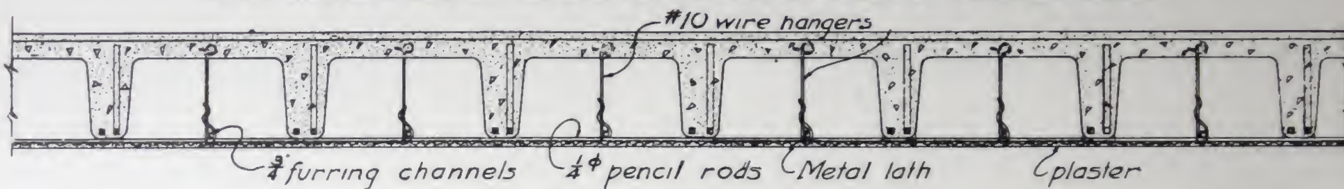
The Steelforms shall be manufactured of No. 16 gauge sheet steel and shall have depressed ribs in the top surface to effect the necessary rigidity. They shall be provided with nail-holes along the lower flanges to permit nailing to the open wood centering, and shall have 3-16" round openings in the center of the top surface of each Steelform to receive wire hangers for the lath ceilings when attached directly to the concrete joists.

CEILING CONSTRUCTION (See Details on Page Eight)

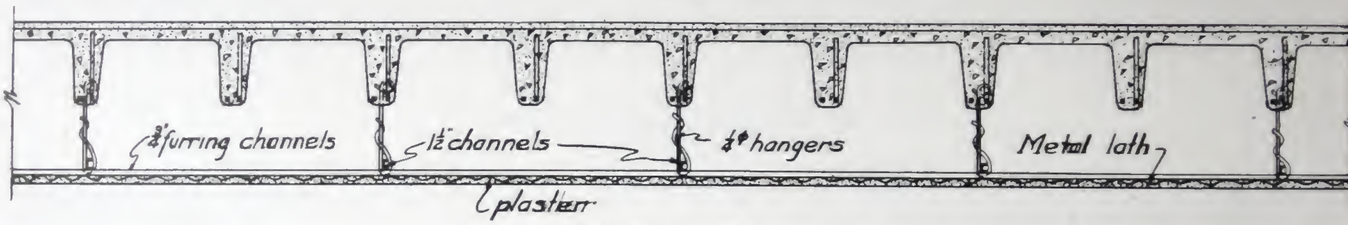
Where lath is to be applied directly against the bottom of concrete joists, or suspended to a distance not exceeding 6" below the joists, place No. 10 gauge soft galvanized wire hangers through the top surface of each Steelform at 3'0" c-c, providing a loop in each hanger to engage the concrete. ¾" CECO cold rolled channels shall be then erected, running parallel and between the rows of joists, cross furred with ¼" round steel pencil rods at 13½" c-c, running transversely to the joists and carrying channels. Lath shall then be applied, using CECO Quality or Economy——gauge expanded metal lath, painted (or galvanized), or CECO ——gauge wire lath, painted. All tying to be done with 18 gauge soft galvanized wire.

Where lath ceiling is to be suspended a greater distance than 6" from the concrete joists, place ¼" round mild steel hangers at 4'0" c-c in the concrete joists through holes bored in the wood centering, with a loop in the hanger to engage the concrete. 1½" CECO cold rolled carrying channels shall then be erected at 4'0" c-c, parallel to the joists and cross furred with ¾" CECO cold rolled channels, running at 13½" c-c transversely to the carrying channels, all tying to be done with 14 gauge soft galvanized wire. Lath shall then be applied as with attached ceiling, using 18 gauge soft galvanized wire.

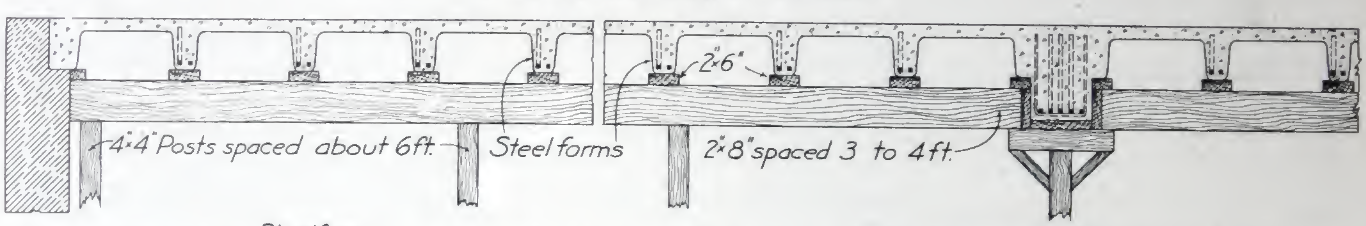
STANDARD CONSTRUCTION DETAILS

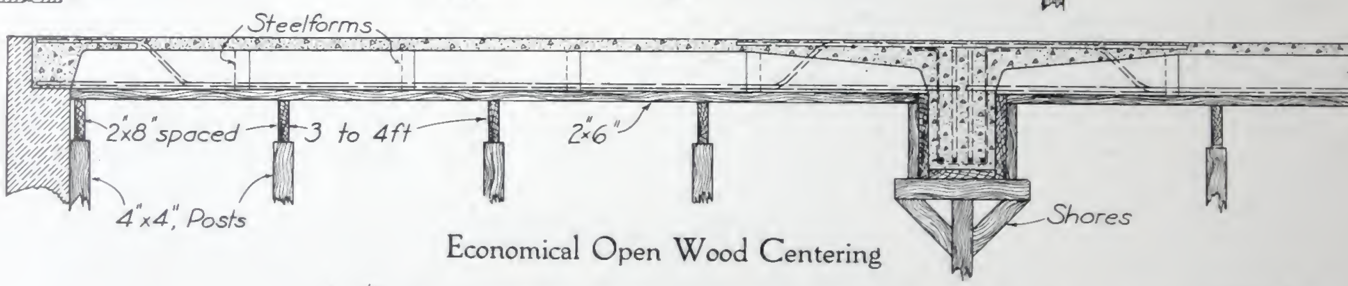


Attached Ceiling Construction

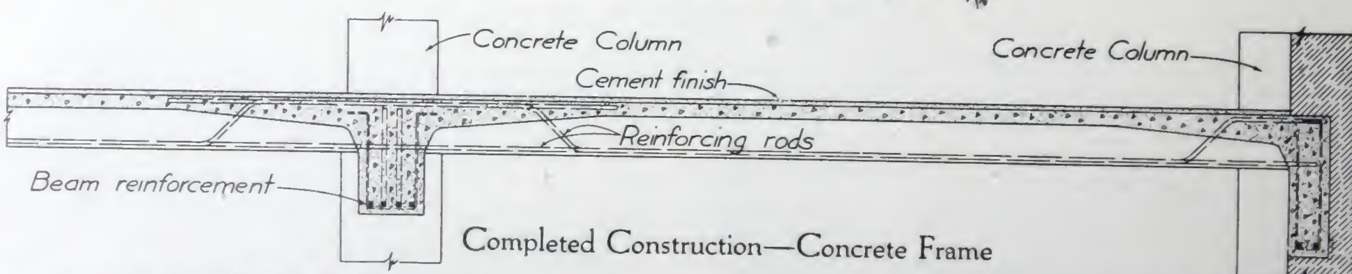


Suspended Ceiling Construction

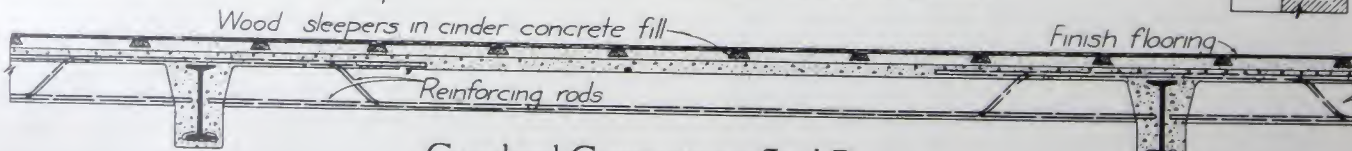




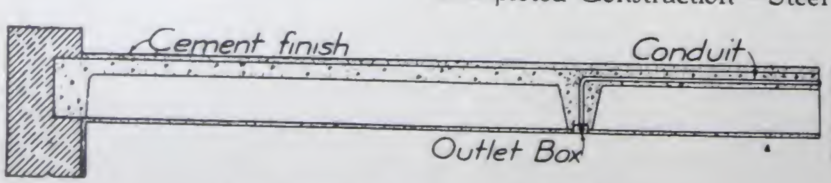
Economical Open Wood Centering



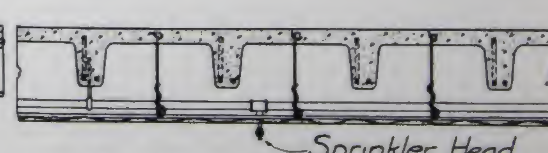
Completed Construction—Concrete Frame



Completed Construction—Steel Frame



Installation of Pipes and Conduits



Installation of Sprinkler System
(Showing concealed pipes)

CONCRETE SPECIFICATIONS

Prosecution of the work under this head by the Contractor is to be governed entirely by the specifications as hereinafter stated, and to follow measurements and details, together with all notes that may appear on the drawings accompanying these specifications. Materials are to be used in the manner specified, and are to be the best of their respective kinds. The concrete and steel sizes shown on the plans must not be altered under any circumstances without the written consent of the Architect.

CEMENT

Cement to be used in this construction shall be a standard brand of Portland Cement, approved by the Architect, and shall conform in every respect to the requirements and specifications of the American Society for Testing Materials.

All cement shall be tested by a competent Inspection Bureau, approved by the Architect, and all expense of testing shall be borne by the Contractor. Reports of the testing by the Inspection Bureau shall be furnished to the Architect before the cement is used. No cement which fails in any of the above requirements shall be used in this work.

Provision shall be made for the storage of the cement so as to exclude as far as possible all moisture from the material, as no cement that has become lumpy may be used.

SAND

The sand shall be clean, coarse, sharp, thoroughly screened, and free from all foreign substances.

BROKEN STONE OR GRAVEL

The aggregate shall be broken stone or screened gravel. Broken stone shall be hard, thoroughly screened, clean and free from dirt. It shall be crushed so that its largest dimension shall pass through a ring of one inch in diameter. Gravel shall be clean, free from dirt and sand, and shall range in size from that of a pea to one inch.

WATER

The water used in mixing concrete shall be free from oil, acid, alkali or organic matter.

PROPORTIONS

Concrete for slabs, beams, columns, footings, etc., shall be mixed in the proportion of one part cement, two parts of sand and four parts of broken stone or gravel. The sand and broken stone or gravel shall be carefully selected, and the proportions so regulated as to obtain a mixture of maximum density, thus reducing the voids in the aggregate to a minimum.

MIXING AND PLACING

The mixing of concrete shall be thorough and complete, as the maximum density and greatest strength depend largely upon thorough and complete mixing. The mixing shall be done in a Batch Machine Mixer, and shall continue a minimum time of one and one half minutes after all the ingredi-

ents are assembled in the mixer. The materials shall be mixed wet enough to insure the concrete to flow sluggishly into the form and about the steel reinforcement. The quantity of water is of the greatest importance in securing satisfactory concrete. Too much water is as objectionable as too little.

Concrete, after the completion of the mixing, shall be conveyed rapidly to the place of final deposit. Under no circumstances shall concrete be used that has partly set. The concrete shall be carefully spaded until all the ingredients are in their proper place, so as to insure a minimum amount of voids. The concrete floor shall be wetted down or sprinkled for several days after pouring, at intervals to be specified by the Architect.

During extremely cold weather the concrete is to be carefully protected to prevent injury from freezing. The water used in mixing concrete shall first be heated either by a steam pipe coil in the water, or by injecting steam directly into the water. The temperature of the water should be about 100 degrees Fahrenheit when used in the mixer. All sand and stone should be heated as uniformly as possible, either by means of direct heating from a fire, or by a steam jet. It is important that no frosty material be used in this work. Each batch of concrete coming from the mixer should be placed in the work immediately after mixing, and the temperature of concrete in place should not be below 50 degrees Fahrenheit. The work should be protected by housing the entire area with canvas. Salamanders shall be used below the floor, same being put into operation several hours before the placing of concrete to insure an even temperature. Sufficient salamanders should be used to maintain a temperature of about 60 degrees Fahrenheit for a period of forty-eight hours.

When concreting is once commenced, it must be carried on vigorously to completion if possible, but if concreting must be stopped before the entire floor is completed, the stop shall be made in the center of beams and center of floor slabs. The plane where concrete work is stopped must be vertical and at right angles to the direction of the beams or slab. In no event shall work be terminated in beams or slabs where future shearing action becomes great, nor at their ends or directly under a heavily concentrated load. Before any concrete is placed against concrete already set the latter shall be carefully cleaned and thoroughly wetted, after which the surface shall be treated with a cement wash.

Should any voids occur in the concrete after the forms are removed, same are to be neatly repointed with cement mortar in the proportions of one part cement to two parts fine sand.

FORMS

All forms for this work shall be substantial and unyielding, properly braced and supported so that the concrete may conform to the design, and be sufficiently tight to prevent the leakage of cement and grout. All forms shall be left in place until the concrete has attained sufficient strength to support itself and any super-imposed loads with safety. The work shall be carefully inspected before the forms are removed.

REINFORCING STEEL

All reinforcing steel shall be hard grade steel, rolled from new billets and shall meet the Manufacturer's Standard Specifications. Reinforcing steel is to be accurately and carefully placed under the supervision of an expert engineer, who shall at all times be in charge of the placing of the reinforcing steel. The steel in slabs and joists shall have not less than one half inch of concrete covering. Ceco Bar Chairs shall be used in all concrete joists, slab and beam constructions to hold the reinforcing bars in their proper position before the pouring of concrete. In beams, columns and footings, reinforcing steel shall have at least one and one-half inches of concrete covering.

For specifications of Meyer Steelform Construction and Ceiling Construction, see page 7.

EXPLANATION OF TABLES

The accompanying tables of Meyer Steelform Construction cover all the spans and loads in ordinary use. Tables are given for all depths of Steelforms, namely: 6″, 8″, 10″ and 12″. 2″, 2½″ and 3″ thickness of concrete slab over joists are given in combination with 4″, 5″ and 6″ joists. Combinations of depth of Steelforms, thickness of concrete slab, and width of joists have been selected with a knowledge of the probability of their use.

Figures given in the tables are safe total loads in pounds per square foot. The tabulated loads include the weight of the concrete joist and slab construction, which is given in each table as "Weight of slab and joist per square foot." In arriving at a safe Live Load, allowance should be made for the dead weight of the concrete construction, the finish on the floors, the ceilings, and the partitions.

The Following Symbols Are Used

fc—designates maximum extreme fibre stress in concrete.

fs—designates maximum tensile stress in steel.

Ø—designates round bars.

□—designates square bars.

The tables have been computed for a maximum tensile stress in the steel of 18,000 pounds per square inch, and a maximum extreme fibre stress in the concrete of 700 pounds per square inch. Combinations of bars have been selected for bending moments of WL-8, WL-10, and WL-12 depending on whether the joists are simple spans, continuous at one end, or continuous over both supports.

The safe loads below and to the left of the lower left hand zig zag line produce shearing stresses in the joists not to exceed 40 pounds per square inch. The safe loads below and to the left of the upper right hand zig zag line produce shearing stresses not to exceed 60 pounds per square inch. Loads to the right and above upper zig zag line produce shearing stresses in excess of 60 pounds per square inch. Shearing stresses have been computed on the basis of the use of our Standard Tapered Endforms. (See page 7.)

Ceco Temperature Fabric or ¼″ round bars should be used for shrinkage or temperature reinforcement in the concrete slab at right angles to the joists.

BAR SIZES AND WEIGHTS

Size	Round Bars		Square Bars	
	Area	Weight	Area	Weight
¼″	.049	.167	.063	.212
⅜″	.110	.376	.141	.478
½″	.196	.668	.250	.850
⅝″	.307	1.043	.391	1.328
¾″	.442	1.502	.563	1.913
⅞″	.601	2 044	.766	2.603
1″	.785	2.670	1.000	3.400
1⅛″	.994	3.380	1.265	4.303
1¼″	1.227	4.172	1.563	5.313

MEYER STEELFORM CONSTRUCTION

Table of Safe Total Loads in Pounds per Sq Ft $f_c = 700$ $f_s = 18000$

DEPTH	6" STEELFORM + 2" CONCRETE															
JOISTS	4" JOISTS 24" C.C. Wt. of slab and joist per sq. ft. = 38 lbs.								5" JOISTS 25" C.C. Wt. of slab and joist per sq. ft. = 40 lbs.							
Size of Bars WL/8	1-1/2ϕ 1-1/2°	2-5/8ϕ	1-5/8ϕ 1-3/4ϕ	1-5/8° 1-3/4°	1-5/8° 1-7/8°				1-1/2ϕ 1-1/2°	2-5/8ϕ	1-5/8ϕ 1-3/4ϕ	1-5/8° 1-3/4°	1-5/8° 1-7/8°			
Size of Bars WL/10	1-3/8° 1-1/2ϕ	2-1/2°	2-5/8ϕ	2-5/8°	1-5/8° 1-3/4°	1-5/8° 1-7/8°			1-3/8° 1-1/2ϕ	2-1/2°	2-5/8ϕ	2-5/8°	1-5/8° 1-3/4°	1-5/8° 1-7/8°		
Size of Bars WL/12	2-3/8°	1-3/8° 1-1/2°	2-1/2°	1-1/2° 1-5/8°	2-5/8°	1-5/8° 1-3/4°	2-3/4°	1-5/8° 1-7/8°	2-3/8°	1-3/8° 1-1/2°	2-1/2°	1-1/2° 1-5/8°	2-5/8°	1-5/8° 1-3/4°	2-3/4°	2-7/8ϕ
Length of span in feet: 10	155	216	276						149	208	266					
11	128	178	228	292					123	172	220	280				
12	107	150	192	246					103	144	184	236				
13	91	128	163	209	255				88	123	157	200	245			
14		110	141	180	220	268				106	135	173	211	258		
15		96	123	157	191	234	276			92	118	150	183	225	265	
16			108	138	168	205	242	250			104	132	161	197	233	248
17			95	122	149	182	215	221			92	117	143	175	207	221
18				109	133	162	192	197				104	128	156	184	197
19				98	119	145	172	177				94	114	139	165	177
20					108	131	155	160					104	126	149	159
21														115	135	145
22																
23																
24																
25																
26																
27																

DEPTH	8" STEEL FORM + 2" CONCRETE															
JOISTS	4" JOISTS 24" C.C. Wt. of slab and joist per sq. ft. = 43 lbs.								5" JOISTS 25" C.C. Wt. of slab and joist per sq. ft. = 46 lbs.							
Size of Bars WL/8	1-1/2ϕ 1-1/2°	2-5/8ϕ	1-5/8ϕ 1-3/4ϕ	1-5/8° 1-3/4°	1-5/8° 1-7/8°	1-3/4ϕ 1-1°			1-1/2ϕ 1-1/2°	2-5/8ϕ	1-5/8ϕ 1-3/4ϕ	1-5/8° 1-3/4°	1-5/8° 1-7/8°	1-3/4ϕ 1-1°		
Size of Bars WL/10	1-3/8° 1-1/2ϕ	2-1/2°	2-5/8ϕ	2-5/8°	1-5/8° 1-3/4°	1-5/8° 1-7/8°	1-3/4° 1-7/8°		1-3/8° 1-1/2ϕ	2-1/2°	2-5/8ϕ	2-5/8°	1-5/8° 1-3/4°	1-5/8° 1-7/8°	1-3/4° 1-7/8°	
Size of Bars WL/12	2-3/8°	1-3/8° 1-1/2°	2-1/2°	1-1/2° 1-5/8°	2-5/8°	1-5/8° 1-3/4°	2-3/4°	1-3/4° 1-7/8°	2-3/8°	1-3/8° 1-1/2°	2-1/2°	1-1/2° 1-5/8°	2-5/8°	1-5/8° 1-3/4°	2-3/4°	1-3/4° 1-7/8°
Length of span in feet: 10	199	277							191	267						
11	164	230	295						159	221	284					
12	138	193	247						133	185	237	304				
13	117	164	210	269					113	158	202	259				
14	101	141	181	232	282				97	136	174	223	272			
15		123	158	202	246					118	152	194	237			
16		108	139	178	216	263				104	133	171	208	252		
17		96	123	157	192	233				92	118	151	184	224		
18			110	140	171	208	247				105	135	164	200	237	
19			98	126	153	186	222				95	121	147	179	213	
20				113	138	168	200	238				109	133	162	192	229
21				103	125	153	181	216				99	121	146	174	208
22				94	114	139	165	197					110	134	159	189
23					104	127	151	180					100	122	145	173
24																
25																
26																
27																

MEYER STEELFORM CONSTRUCTION

Table of Safe Total Loads in Pounds per Sq.Ft. fc=700 fs=18000

DEPTH	10" STEELFORM + 2" CONCRETE															
JOISTS	4" JOISTS 24" C.C. Wt. of slab and joist per sq.ft. = 48 lbs.								5" JOISTS 25" C.C. Wt. of slab and joist per sq.ft. = 52 lbs.							
Size of Bars WL/8	1-1/2■ 1-5/8°	2-5/8°	1-3/4■ 1-3/4°	2-7/8■	2-7/8°				1-1/2■ 1-5/8°	2-5/8°	1-3/4■ 1-3/4°	2-7/8■	2-7/8°			
Size of Bars WL/10	2-1/2°	2-5/8■	2-5/8°	1-5/8° 1-3/4°	1-3/4° 1-7/8■	1-3/4° 1-7/8°			2-1/2■	2-5/8■	2-5/8°	1-5/8° 1-3/4°	1-3/4° 1-7/8■	1-3/4° 1-7/8°		
Size of Bars WL/12	1-3/8° 1-1/2■	2-1/2°	1-1/2° 1-5/8°	2-5/8°	1-5/8° 1-3/4■	2-3/4°	1-3/4■ 1-7/8°	2-7/8■	1-3/8° 1-1/2■	2-1/2■	1-1/2° 1-5/8■	2-5/8■	1-5/8■ 1-3/4°	2-3/4°	1-3/4° 1-7/8°	2-7/8°
Length of span in feet 13	200	256							192	247						
14	173	221	288						166	213	278					
15	150	193	250	300					145	186	241	290				
16	132	169	220	265					127	163	212	254				
17	117	150	195	234	286				112	144	188	226	275			
18	104	134	174	209	254				100	129	168	201	245			
19	94	120	156	188	228	270			90	116	150	180	220	260		
20		108	141	169	206	244	288			104	136	163	198	234	277	
21		98	128	154	187	220	262			95	123	148	180	212	251	
22			117	140	170	201	238	273			112	135	164	194	229	262
23			106	128	156	184	218	250			103	123	150	177	210	240
24			98	117	143	169	200	230			94	113	138	162	192	220
25				108	132	156	184	211				104	127	150	177	203
26				99	122	144	170	195				96	117	138	164	188
27					113	133	158	181					109	128	152	174
28					105	124	147	168					101	120	141	162
29					98	116	137	157					94	111	132	151
30						108	128	147						104	123	141

DEPTH	12" STEELFORM + 2" CONCRETE															
JOISTS	4" JOISTS 24" C.C. Wt. of slab and joist per sq.ft. = 54 lbs.								5" JOISTS 25" C.C. Wt. of slab and joist per sq.ft. = 59 lbs.							
Size of Bars WL/8	1-1/2■ 1-5/8°	2-5/8°	1-3/4■ 1-3/4°	2-7/8■	2-7/8°	1-7/8° 1-1°			2-5/8°	1-3/4■ 1-3/4°	2-7/8■	2-7/8°	1-7/8° 1-1°			
Size of Bars WL/10	2-1/2°	2-5/8■	2-5/8°	1-5/8° 1-3/4°	1-3/4° 1-7/8■	1-3/4° 1-7/8°	2-1■		2-5/8■	2-5/8°	1-5/8° 1-3/4°	1-3/4° 1-7/8■	1-3/4° 1-7/8°	2-1■		
Size of Bars WL/12	1-3/8° 1-1/2°	2-1/2°	1-1/2° 1-5/8°	2-5/8°	1-5/8° 1-3/4°	2-3/4■	1-3/4° 1-7/8°	2-7/8■	2-1/2°	1-1/2° 1-5/8°	2-5/8°	1-5/8■ 1-3/4°	2-3/4°	1-3/4° 1-7/8°	2-7/8■	1-7/8° 1-1°
Length of span in feet 13	238								294							
14	205	262							253	322						
15	178	228							220	281	342	418				
16	157	200	256						194	247	300	368				
17	139	178	227	277					173	219	266	326				
18	124	158	202	247					153	195	238	290	342			
19	111	142	182	222	271				137	175	213	260	307	363		
20	100	128	164	200	244				124	158	192	235	277	328	377	
21	91	116	148	181	222	261				143	174	213	252	297	342	392
22		106	135	165	202	238				130	159	194	230	271	310	357
23		97	124	151	184	218	258				145	177	210	248	284	327
24			114	139	170	200	236				133	163	192	228	261	300
25			105	128	156	184	218	252				150	177	210	240	276
26			97	118	144	170	202	232				139	163	194	222	256
27				109	134	158	187	216					152	180	206	237
28				102	124	147	174	200					141	167	191	220
29				95	116	137	162	187						156	178	206
30					108	128	151	175						145	167	192

MEYER STEELFORM CONSTRUCTION

Table of Safe Total Loads in Pounds per Sq. Ft. $f_c = 700$ $f_s = 18000$

DEPTH: 6" STEELFORM + 2½" CONCRETE

JOISTS	4" JOISTS 24" CC — Wt. of slab and joist per sq. ft. = 44 lbs.								5" JOISTS 25" CC — Wt. of slab and joist per sq. ft. = 46 lbs.							
Size of Bars WL/8	1-½, 1-½	2-⅝	1-⅝, 1-¾	1-⅝, 1-¾	1-⅝, 1-⅞				1-½, 1-½	2-⅝	1-⅝, 1-¾	1-⅝, 1-¾	1-⅝, 1-⅞			
Size of Bars WL/10	1-⅜, 1-½	2-½	2-⅝	2-⅝	1-⅝, 1-¾	1-⅝, 1-⅞			1-⅜, 1-½	2-½	2-⅝	2-⅝	1-⅝, 1-¾	1-⅝, 1-⅞		
Size of Bars WL/12	2-⅜	1-⅜, 1-½	2-½	1-½, 1-⅝	2-⅝	1-⅝, 1-¾	2-¾	1-¾, 1-⅞	2-⅜	1-⅜, 1-½	2-½	1-½, 1-⅝	2-⅝	1-⅝, 1-¾	2-¾	1-¾, 1-⅞
Length of span in feet																
10	166	231	296	380					160	222	284	365				
11	137	191	244	315	382				132	184	235	302	368			
12	115	161	206	265	321	391			111	154	197	254	309	376		
13		137	175	226	273	333				131	168	216	263	320		
14		118	151	195	236	287	340			113	145	187	227	276	326	
15			131	170	205	250	296	350			126	164	197	240	284	336
16			115	150	180	220	260	308			111	145	174	211	250	296
17				133	160	195	230	273				128	154	187	221	262
18				118	143	174	205	243				114	137	167	197	234
19					128	156	184	218					123	150	177	210
20					115	141	166	197					111	135	160	189
21						128	151	178						123	145	172
22						116	137	163						112	132	156
23																
24																
25																
26																
27																

DEPTH: 8" STEELFORM + 2½" CONCRETE

JOISTS	4" JOISTS 24" CC — Wt of slab and joist per sq. ft. = 49 lbs.								5" JOISTS 25" CC — Wt. of slab and joist per sq. ft. = 52 lbs							
Size of Bars WL/8	2-⅝	1-⅝, 1-¾	1-⅝, 1-¾	1-⅝, 1-⅞	2-⅞	1-⅞, 1-1			2-⅝	1-⅝, 1-¾	1-⅝, 1-¾	1-⅝, 1-⅞	2-⅞	1-⅞, 1-1		
Size of Bars WL/10	2-½	2-⅝	2-⅝	1-⅝, 1-¾	1-¾, 1-⅞	1-¾, 1-⅞	2-1		2-½	2-⅝	2-⅝	1-⅝, 1-¾	1-¾, 1-⅞	1-¾, 1-⅞	2-1	
Size of Bars WL/12	1-⅜, 1-½	2-½	1-½, 1-⅝	2-⅝	1-⅝, 1-¾	2-¾	1-¾, 1-⅞	2-⅞	1-⅜, 1-½	2-½	1-½, 1-⅝	2-⅝	1-⅝, 1-¾	2-¾	1-¾, 1-⅞	2 ⅞
Length of span in feet																
10	292	375							281	360						
11	241	310							232	298						
12	203	260	332						195	250	318					
13	173	222	284	347					166	214	271	334				
14	149	191	244	299	364				143	184	234	288	350			
15	130	167	214	260	316	374			125	160	204	250	304	360		
16		146	187	229	278	329	391			141	179	220	268	316	376	
17		130	166	203	246	291	346	396		125	159	195	237	280	333	380
18			148	181	220	260	309	356			141	174	212	250	297	340
19			133	162	197	233	227	320			127	156	190	224	266	304
20				146	178	210	250	290				141	171	202	240	275
21				133	161	191	227	260				128	155	183	218	250
22					147	174	207	238					142	167	198	227
23					135	159	184	218					130	153	182	208
24						146	174	200						140	167	191
25						134	160	184						129	154	176
26																
27																

MEYER STEELFORM CONSTRUCTION

Table of Safe Total Loads in Pounds per Sq ft $f_c = 700$ $f_s = 18000$

DEPTH: 10" STEELFORM + 2½" CONCRETE

JOISTS: 4" Joists 24" C C — Wt of slab & joist per sq ft = 54#

Size of Bars / Length of span in feet								
WL/8	2-5/8	1-5/8 1-3/4	1-5/8 1-3/4	1-5/8 1-7/8	2-7/8	1-7/8 1-1		
WL/10	2-1/2	2-5/8	2-5/8	1-5/8 1-3/4	1-3/4 1-7/8	1-3/4 1-7/8	2-1	
WL/12	1-5/8 1-1/2	2-1/2	1-1/2 1-5/8	2-5/8	1-5/8 1-3/4	2-3/4	1-3/4 1-7/8	2-7/8
13	209	269	345					
14	180	231	297	361				
15	157	202	259	314				
16	138	177	228	276	338			
17		157	200	245	300	352		
18		140	180	218	267	314		
19			162	196	240	282	335	
20			146	179	216	254	302	349
21				160	196	231	275	317
22				146	179	210	250	288
23					164	195	228	264
24					150	177	210	242
25					138	163	193	223
26						150	179	206
27							166	191
28							154	178
29								166
30								155

JOISTS: 5" Joists 25" C C — Wt. of slab & joist per sq ft = 58#

Size of Bars / Length of span in feet								
WL/8	1-5/8 1-3/4	1-5/8 1-3/4	1-5/8 1-7/8	2-7/8	1-7/8 1-1			
WL/10	2-5/8	2-5/8	1-5/8 1-3/4	1-3/4 1-7/8	1-3/4 1-7/8	2-1		
WL/12	2-1/2	1-1/2 1-5/8	2-5/8	1-5/8 1-3/4	2-3/4	1-3/4 1-7/8	2-7/8	1-7/8 1-1
13	258	332						
14	223	286	347					
15	194	249	302					
16	170	219	266	325				
17	151	192	235	288	338			
18	135	173	210	257	301			
19		156	188	230	271	322		
20		143	170	208	244	291	335	
21			154	188	222	264	305	
22			140	172	202	240	277	318
23				157	185	220	254	291
24				144	170	201	232	267
25				133	156	186	214	246
26					145	172	198	228
27						159	183	211
28						148	171	196
29							160	183
30							149	171

JOISTS: 6" Joists 26" C C — Wt of slab & joist per sq ft = 62#

Size of Bars / Length of span in feet								
WL/8	1-5/8 1-3/4	1-5/8 1-3/4	1-5/8 1-7/8	2-7/8	1-7/8 1-1			
WL/10	2-5/8	2-5/8	1-5/8 1-3/4	1-3/4 1-7/8	1-3/4 1-7/8	2-1		
WL/12	2-1/2	1-1/2 1-5/8	2-5/8	1-5/8 1-3/4	2-3/4	1-3/4 1-7/8	2-7/8	1-7/8 1-1
13	247	318	387	472				
14	214	274	334	406				
15	186	238	290	353	416			
16	163	210	254	311	365			
17	145	184	225	276	324			
18	129	166	201	246	289			
19		149	180	221	260	308		
20		135	163	199	234	278	321	
21			148	181	212	252	292	
22			134	165	193	230	265	305
23				151	177	210	243	279
24				138	162	193	223	256
25				127	150	178	206	236
26					138	165	190	218
27						153	176	202
28						142	164	188
29							153	175
30							143	164

DEPTH: 12" STEELFORM + 2½" CONCRETE

JOISTS: 4" Joists 24" C C — Wt of slab and joist per sq ft = 60#

Size of Bars / Length of span in feet								
WL/8	1-5/8 1-3/4	1-5/8 1-3/4	1-5/8 1-7/8	2-7/8	1-7/8 1-1			
WL/10	2-5/8	2-5/8	1-5/8 1-3/4	1-3/4 1-7/8	1-3/4 1-7/8	2-1	1-1 1-1	
WL/12	2-1/2	1-1/2 1-5/8	2-5/8	1-5/8 1-3/4	2-3/4	1-3/4 1-7/8	2-7/8	1-7/8 1-1
13	315	405	492					
14	272	348	425					
15	237	303	370					
16	210	266	325					
17	186	236	287	352				
18	166	210	256	314	370			
19	149	189	230	282	332			
20	135	170	208	254	300			
21		155	188	231	272			
22		140	172	210	248	293		
23			157	192	227	268		
24			144	176	208	246	284	
25			133	163	192	227	250	301
26				150	177	210	240	278
27				140	165	194	222	258
28					153	181	206	240
29					143	168	192	224
30						157	180	209

JOISTS: 5" Joists 25" C C — Wt of slab & joist per sq ft = 65#

Size of Bars / Length of span in feet								
WL/8	1-5/8 1-3/4	1-5/8 1-7/8	2-7/8	1-7/8 1-1	2-1			
WL/10	2-5/8	1-5/8 1-3/4	1-3/4 1-7/8	1-3/4 1-7/8	2-1	1-1 1-1		
WL/12	1-1/2 1-5/8	2-5/8	1-5/8 1-3/4	2-3/4	1-3/4 1-7/8	2-7/8	1-7/8 1-1	2-1
13	390	460						
14	336	396	500					
15	293	345	435	515				
16	258	313	382	450				
17	228	276	340	400				
18	204	246	302	358				
19	183	221	271	320				
20	165	200	244	289	340			
21	150	180	222	262	310			
22	136	165	202	239	282			
23		151	185	218	258			
24		138	170	200	236	274		
25		128	156	185	218	252	289	
26			145	171	202	234	268	303
27			134	158	187	216	248	281
28				147	174	202	231	262
29				137	162	188	215	244
30					151	176	201	228

JOISTS: 6" Joists 26" C C — Wt of slab & joist per sq ft = 69#

Size of Bars / Length of span in feet								
WL/8	1-5/8 1-3/4	1-5/8 1-7/8	2-7/8	1-7/8 1-1	2-1			
WL/10	2-5/8	1-5/8 1-3/4	1-3/4 1-7/8	1-3/4 1-7/8	2-1	1-1 1-1		
WL/12	1-1/2 1-5/8	2-5/8	1-5/8 1-3/4	2-3/4	1-3/4 1-7/8	2-7/8	1-7/8 1-1	2-1
13	372	454						
14	320	392	480					
15	279	340	418	490				
16	245	299	367	430				
17	217	264	325	380	450			
18	193	236	290	340	404			
19	174	212	260	305	362	416		
20	156	192	234	276	326	375	430	
21	143	173	213	250	296	342	393	
22	129	158	193	228	270	310	356	
23		145	177	209	247	285	330	
24		133	162	192	228	262	300	
25			150	177	209	230	277	
26			139	163	193	221	257	291
27			128	151	179	204	238	270
28				141	166	190	221	251
29				131	155	176	206	234
30					145	166	193	218

MEYER STEELFORM CONSTRUCTION

Table of Safe Total Loads in Pounds per Sq. ft. $f_c = 700$ $f_s = 18000$

DEPTH	6" STEELFORM + 3" CONCRETE															
JOISTS	5" JOISTS 25" CC — Wt. of slab and joist per sq. ft. = 52 lbs.								6" JOISTS 26" CC — Wt. of slab and joist per sq. ft. = 54 lbs.							
Size of Bars WL/8	2-5/8	1-5/8 1-3/4	1-5/8 1-3/4	1-5/8 1-7/8	2-7/8	1-7/8 1-1			2-5/8	1-5/8 1-3/4	1-5/8 1-3/4	1-5/8 1-7/8	2-7/8	1-7/8 1-1		
Size of Bars WL/10	2-1/2	2-5/8	2-5/8	1-5/8 1-3/4	1-3/4 1-7/8	1-3/4 1-7/8	2-1		2-1/2	2-5/8	2-5/8	1-5/8 1-3/4	1-3/4 1-7/8	1-3/4 1-7/8	2-1	
Size of Bars WL/12	1-3/8 1-1/2	2-1/2	1-1/2 1-5/8	2-5/8	1-5/8 1-3/4	2-3/4	1-3/4 1-7/8	2-7/8	1-3/8 1-1/2	2-1/2	1-1/2 1-5/8	2-5/8	1-5/8 1-3/4	2-3/4	1-3/4 1-7/8	2-7/8
Length of span in feet 10	237	304	389						227	291	378					
11	196	250	321	392					187	241	312	376				
12	164	311	270	330	403				157	202	262	316	387			
13	140	180	230	280	344				134	172	223	269	330			
14		155	198	242	296	349				148	193	232	284	334		
15			173	211	258	304	360				168	202	248	291	344	
16			152	185	227	267	316	363			147	177	218	256	303	348
17				164	201	237	280	322				157	193	226	268	308
18				146	179	211	250	287				140	172	202	240	275
19					161	189	224	257					154	181	215	247
20					145	171	202	232					139	164	194	223
21						155	183	211						149	176	202
22							167	192							160	184
23																
24																
25																
26																
27																

DEPTH	8" STEELFORM + 3" CONCRETE															
JOISTS	5" JOISTS 25" CC — Wt of slab and joist per sq ft = 58 lbs								6" JOISTS 26" CC — Wt. of slab and joist per sq ft. = 61 lbs.							
Size of Bars WL/8	1-5/8 1-3/4	1-5/8 1-3/4	1-5/8 1-7/8	2-7/8	1-7/8 1-1				1-5/8 1-3/4	1-5/8 1-3/4	1-5/8 1-7/8	2-7/8	1-7/8 1-1			
Size of Bars WL/10	2-5/8	2-5/8	1-5/8 1-3/4	1-3/4 1-7/8	1-3/4 1-7/8	2-1			2-5/8	2-5/8	1-5/8 1-3/4	1-5/8 1-7/8	1-3/4 1-7/8	2-1		
Size of Bars WL/12	2-1/2	1-1/2 1-5/8	2-5/8	1-5/8 1-3/4	2-3/4	1-3/4 1-7/8	2-7/8	1-7/8 1-1	2-1/2	1-1/2 1-5/8	2-5/8	1-5/8 1-3/4	2-3/4	1-3/4 1-7/8	2-7/8	1-7/8 1-1
Length of span in feet 10	379								363							
11	313	408							300	390						
12	263	343	410						252	328	395					
13	274	292	350						215	279	336					
14	193	252	302	370					185	241	290	355				
15	168	219	263	322	380				161	210	253	309	364			
16	148	193	231	283	334	394			142	184	222	272	320	378		
17		171	205	251	296	350	402			163	197	240	284	334	386	
18		152	183	224	264	312	359	412		145	175	214	253	298	344	398
19			164	201	237	280	321	370			157	192	227	268	308	357
20				181	214	253	291	336				174	205	242	278	322
21				164	194	229	264	303				158	186	220	253	292
22					176	208	240	276					169	200	230	264
23					162	191	220	253					155	183	210	242
24						175	202	232						168	193	222
25						162	186	214						154	178	204
26																
27																

MEYER STEELFORM CONSTRUCTION

Table of Safe Total Loads in Pounds per Sq.ft $f_c = 700$ $f_s = 18000$

DEPTH: 10" STEELFORM + 3" CONCRETE

JOISTS: 5" Joists 25" CC — Wt. of slab and joist per sq.ft = 64 lbs

Size of Bars								
WL/8	1-5/8□ 1-3/4□	1-5/8□ 1-7/8□	2-7/8□	1-7/8□ 1-1□	2-1□			
WL/10	2-5/8□	1-5/8□ 1-3/4□	1-3/4□ 1-7/8ϕ	1-3/4□ 1-7/8□	2-1ϕ	1-1ϕ 1-1□		
WL/12	1-1/2□ 1-5/8□	2-5/8□	1-5/8□ 1-3/4□	2-3/4□	1-3/4□ 1-7/8□	2-7/8□	1-7/8□ 1-1□	2-1□
Length of span in feet								
13	345	420						
14	300	363	441					
15	260	316	384					
16	230	278	338	400				
17	203	246	300	354	420			
18	180	220	267	316	374			
19	162	197	240	283	335	384		
20	146	178	216	256	303	346	402	
21		161	196	232	275	314	364	414
22			178	211	250	286	332	376
23			163	193	229	262	304	345
24				177	210	240	278	316
25				164	194	222	257	292
26					179	205	238	270
27					166	190	220	250
28						177	205	233
29						165	191	217
30							178	203

JOISTS: 6" Joists 26" CC — Wt. of slab and joist per sq.ft = 68 lbs

Size of Bars								
WL/8	1-5/8□ 1-3/4□	1-5/8□ 1-7/8□	2-7/8□	1-7/8□ 1-1□	2-1□			
WL/10	2-5/8□	1-5/8□ 1-3/4□	1-3/4□ 1-7/8ϕ	1-3/4□ 1-7/8□	2-1ϕ	1-1ϕ 1-1□		
WL/12	1-1/2□ 1-5/8□	2-5/8□	1-5/8□ 1-3/4□	2-3/4□	1-3/4□ 1-7/8□	2-7/8□	1-7/8□ 1-1□	2-1□
Length of span in feet								
13	332	403						
14	289	348	422					
15	252	303	368					
16	221	266	324	383				
17	196	236	287	339	402			
18	175	210	256	302	358			
19	157	189	230	271	322	368		
20	142	170	207	245	290	332	385	
21		155	188	222	257	301	349	396
22			171	202	240	274	318	361
23			157	185	220	251	291	330
24				170	201	230	267	303
25				157	186	212	246	280
26					172	196	228	258
27					159	182	211	240
28						169	196	223
29						158	183	207
30							171	194

DEPTH: 12" STEELFORM + 3" CONCRETE

JOISTS: 5" Joists 25" CC — Wt. of slab and joist per sq.ft = 71 lbs

Size of Bars								
WL/8	1-5/8□ 1-7/8□	2-7/8□	1-7/8□ 1-1□	2-1□	1-1□ 1-1 1/8□			
WL/10	1-5/8□ 1-3/4□	1-3/4□ 1-7/8ϕ	1-3/4□ 1-7/8□	2-1ϕ	1-1ϕ 1-1□	1-1□ 1-1 1/8□		
WL/12	2-5/8□	1-5/8□ 1-3/4□	2-3/4□	1-3/4□ 1-7/8□	2-7/8□	1-7/8□ 1-1□	2-1□	1-1□ 1-1 1/8□
Length of span in feet								
13								
14	422							
15	368	450						
16	324	395						
17	287	350	414					
18	256	312	369	436				
19	229	280	332	392	448			
20	207	253	299	354	404			
21	188	230	272	321	366	425		
22	171	209	247	292	332	387	440	
23		191	226	267	305	354	402	
24		175	208	246	280	326	369	417
25			191	226	259	300	340	384
26			177	209	239	278	314	355
27				194	222	257	292	330
28				180	206	239	271	306
29					192	223	253	286
30					179	208	236	267

JOISTS: 6" Joists 26" CC — Wt. of slab and joist per sq.ft = 75 lbs

Size of Bars								
WL/8	1-5/8□ 1-7/8□	2-7/8□	1-7/8□ 1-1□	2-1□	1-1□ 1-1 1/8□			
WL/10	1-5/8□ 1-3/4□	1-3/4□ 1-7/8ϕ	1-3/4□ 1-7/8□	2-1ϕ	1-1ϕ 1-1□	1-1□ 1-1 1/8□		
WL/12	2-5/8□	1-5/8□ 1-3/4□	2-3/4□	1-3/4□ 1-7/8□	2-7/8□	1-7/8□ 1-1□	2-1□	1-1□ 1-1 1/8□
Length of span in feet								
13								
14	405	494						
15	353	431						
16	311	379	446					
17	275	336	396					
18	245	299	354	418				
19	220	268	318	376	429			
20	199	242	286	339	387			
21	180	220	260	308	352	408		
22	164	200	236	280	320	372	422	
23		183	216	256	293	340	385	
24		168	199	237	269	312	354	400
25			183	217	248	288	326	369
26			169	200	229	268	301	341
27				186	212	247	279	316
28				173	198	230	260	294
29					184	214	242	274
30					172	200	226	256

FLOOR TESTS

City of Detroit
DEPARTMENT OF BUILDINGS
406-7 CITY HALL

BUILDING COMMISSION
ALANSON A MOORE
A C STELLWAGEN
WILLIAM J MCANEENY
LOUIS SCHMIDT

HENRY A DUPONT
CHIEF INSPECTOR
CHAS C LUDY
SECRETARY

Dec. 18th-1914.

Concrete Engineering Co.,
% New Stott Building,
77-9 Michigan Ave., City.

Gentlemen:-

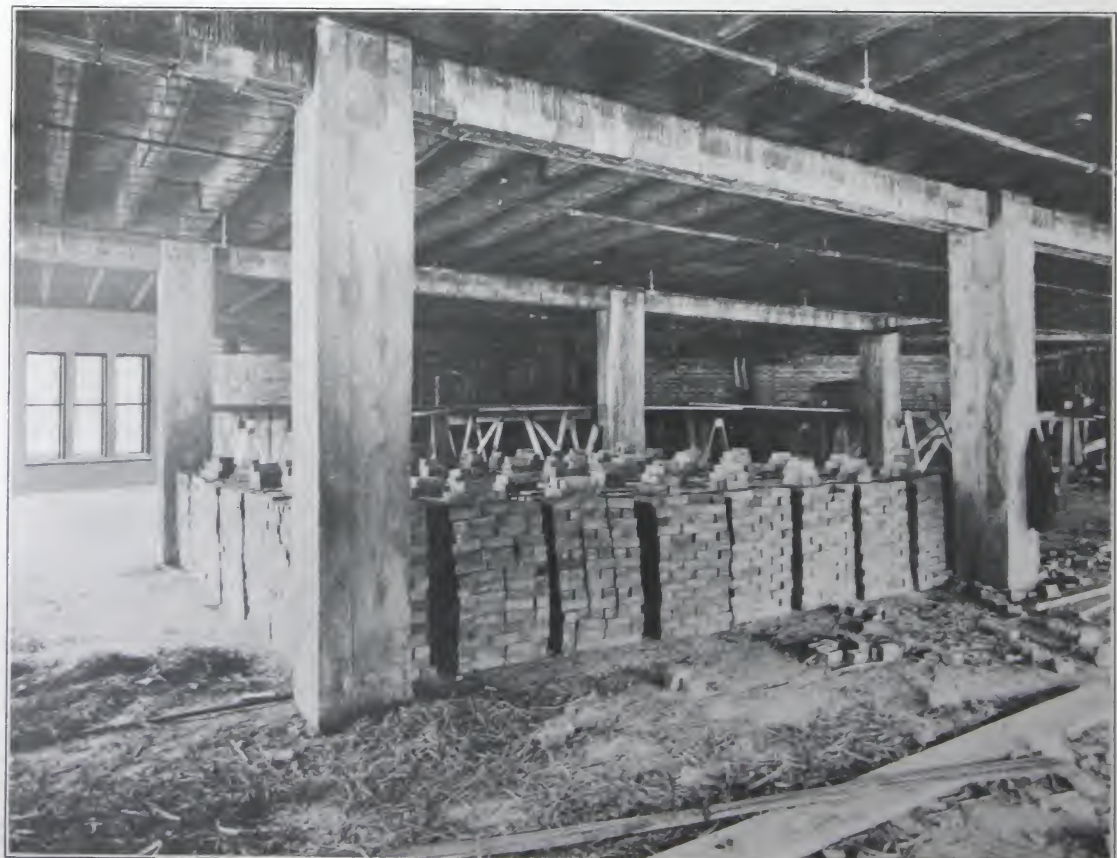
Regarding the floor test upon the New Stott Building.

On December 3rd, we tested the third panel from the east side and second panel from the south side of the third floor. This panel has a span of 18 foot, 6 inches, is designed for 100 lbs. per square foot and 20 lbs. of finish and was 44 days old at the time of test. It was loaded by piling bricks in piers 24 x 24 inches, the piers being six (6) inches apart and of sufficient height to give a uniform live load of 220 lbs. per square foot of floor. After about twenty-four (24) hours the maximum deflection was 3/16 inch or equal to 1/1200 of the span. No cracks could be observed. We consider this a very satisfactory showing.

Respectfully yours,
DEPARTMENT OF BUILDINGS.
Per Frank Burton
CONCRETE ENGINEER.

FB.LDM.

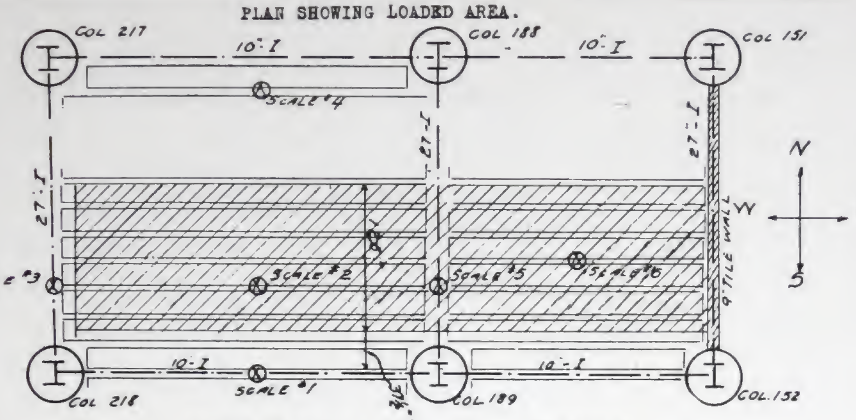
The David Stott Building, Detroit, Michigan, is a steel frame with Meyer Steelform Floor Construction. A load test was made on a typical panel by the City Building Department of Detroit, amounting to two times the live load for which the floor was designed. The load consisted of independent brick piers which prevented arching to the supporting girders. The deflection was measured and found to be a maximum of 1-1200 of the span. The actual deflection of the floor was probably less than this, owing to the deflection of the supporting girders. This building was originally designed for tile concrete joist floors. The use of Meyer Steelform Construction effected a saving of thirty pounds per square foot, permitting a large reduction in the supporting steel girders and columns. The complete change effected a great economy over the tile design.



David Stott Building Test, Detroit, Michigan

Report of May Company Building Test—Cleveland, Ohio

PLAN SHOWING LOADED AREA.



REPORT OF TESTS ON FIRST FLOOR CONCRETE JOISTS. MAY COMPANY BUILDING.
March 9th to 15th, 14.

SECTION #I.

Area tested 125" x 45'-6½" x 35" deep.

Sand used 90# per cubic foot.

Load per square foot, 250#

Total distributed load, 125,000 pounds or 62 tons.

Ordinary 24# family scales, placed below joist tested, 1" square hard wood stick 10' long from bottom of joist to top scales. Scales registered about 6#, which held rod against joist.

Deflection of Scales - .0015 inches per oz.

Deflection at different scales.

Scale #1 - 1/32" Deflection
Scale #2 - 1/4" "
Scale #3 - 1/8" "
Scale #4 - 1/32" "
Scale #5 - 1/32" "
Scale #6 - 3/16" "

Load remained on the floor, March 9th, 10th, 11th, 12th, 13th, 14th and 15th, 1914.

Deflection same at all dates of reading.

Robert R. Stewart
City Concrete Inspector, May Company Bldg.

Louis E. Sholtes
For D. H. Burnham & Co.

Other Standard Designs Prepared by our Engineering Department

Flat Slab Floor Construction
Kirschbraun Creamery, Omaha, Nebraska

Beam and Girder Floor Construction
Hoagland Building, Omaha, Nebraska

CECO FIREPROOFING MATERIALS

This Handbook heralds an important development in the use of Ceco Fireproofing Materials. In the past our Engineering Department, in conjunction with the prominent architects and engineers throughout the country have specified Ceco Fireproofing Materials in a great many structures of importance, and the Contract Department have handled the erection. In this way, Ceco Fireproofing Materials have been almost exclusively used in the work handled by this Company alone. With this wide use of Ceco Fireproofing Materials, we have had every opportunity to witness the perfect satisfaction caused by the economy and quality of the materials, both as regards their initial cost, and the cost of the subsequent installation.

"Nothing succeeds like Success,' for all concerned, and we have been aiming to make our service and distribution methods so comprehensive that Ceco Fireproofing Materials might be used, not only by our Contract Department, but by any one, in any building, large or small.

The builder is therefore, now enabled to secure Ceco Fireproofing Materials from his dealer, or if the dealer cannot furnish them, immediate shipment of his requirements can be made from one of our warehouses.

Our service is distinctive in that it is entirely complete. Through your dealer you may secure Ceco Fireproofing Materials. And we do more than supply the materials. When desired through the Contract Department, Ceco Fireproofing Materials are installed or erected on the job, in accordance with the standard methods, and to meet the approval of the architect or engineer.

In the following paragraphs we have presented a condensed description, with illustrations, of the various Ceco Fireproofing Materials, and their uses.

CECO EXPANDED METAL LATH

GENERAL ADVANTAGES

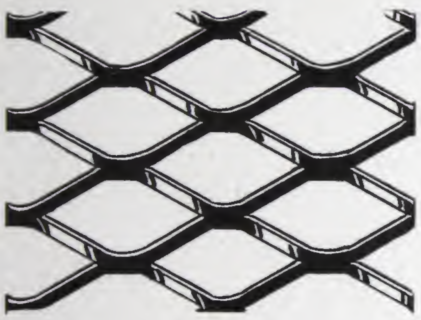
Since three coats of plaster are generally used with Ceco Metal Lath, a solid, uniform coat of plaster is obtained throughout and the wall is an excellent non-conductor of heat, cold and moisture. Due to the fact that Ceco Metal Lath is always furnished painted (galvanized if desired) and is further protected by the plaster, an absolutely permanent base and reinforcement for the plastered interior, or stuccoed exterior, is assured. Unlike wood lath, there is no particular expansion or contraction with Ceco Metal Lath, and the subsequent cracking and falling away of the plaster is entirely eliminated.

Ceco Metal Lath imbeds itself in the plaster and retains its grip indefinitely. It does not absorb moisture, hence does not rust and stain the plaster, or collect dust on the plaster surface. With the

thorough distribution of metal through the plaster, all cracking is eliminated and decorations may be applied immediately without difficulty. Ceco Metal Lath reinforces and the plaster protects,—together they effect a permanent, fireproof construction, for ceilings, partitions, etc.

Being flexible, Ceco Metal Lath is ideal for use in ornamental work of every description. It is also particularly adapted for use in partitions. A permanent, soundproof partition of great strength may be constructed using Ceco Metal Lath and Ceco Cold Rolled Channels, or Ceco Prong Studding, which will effect a considerable saving in floor space and dead load. Cheaper lathing materials may be secured, but considering every factor of expense—maintenance, permanency of investment, etc.—Ceco Metal Lath is undeniably the most economical and satisfactory base and reinforcement for plaster and stucco work of every description.

CECO ECONOMY LATH



This style is an especially economical, light weight lath of small mesh, insuring a thorough key and minimum coat of plaster. It has a twist or slant in the strands of the mesh which prevents shearing of plaster and increases the rigidity of the sheets. Made from highest grade, open hearth steel, and furnished painted, galvanized after expansion, or in copper iron alloy. It has a wide range of weights and gauges, suitable for practically every type of construction.

Gauge	Size of Sheet Inches	Weight per Sq. Yard	Yards per Sheet	Sheets per Bundle	Yards per Bundle
No. 18	21″x97″	5.50 lbs.	1½	14	21
No. 20	21″x97″	4.15 lbs.	1½	14	21
No. 22	21″x97″	3.40 lbs.	1½	14	21
No. 22½	21″x97″	3.33 lbs.	1½	14	21
No. 23	21″x97″	3.10 lbs.	1½	14	21
No. 24	21″x97″	2.75 lbs.	1½	14	21
No. 25	21″x97″	2.40 lbs.	1½	14	21
No. 26	21″x97″	2.10 lbs.	1½	14	21

Add one pound per square yard to above weights for lath galvanized after expansion.

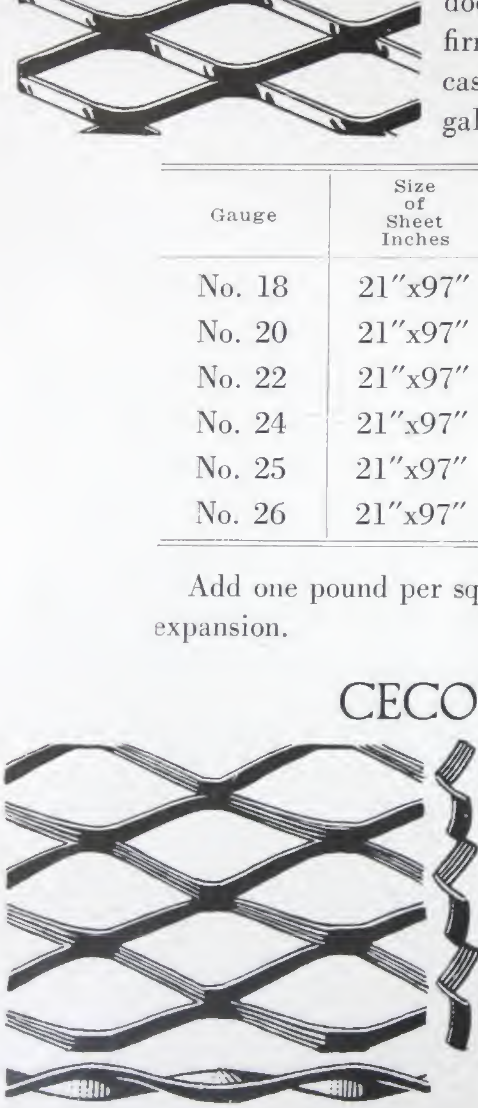
CECO QUALITY LATH

As the name implies, this is a high grade lath to be used where quality is the first essential. It has wide strands of metal and weighs more than ordinary lath. As indicated by the schedule of weights for the various gauges, more steel is used in this lath and a minimum of plaster is obtained, due to the solid rigidity of the lath itself. It does not bend beneath the plasterer's trowel, but stays straight and firm, requiring a uniform coat of plaster throughout. As in the case of Ceco Economy Lath, this material is furnished either painted, galvanized after expansion, or in copper iron alloy.

Gauge	Size of Sheet Inches	Weight per Sq. Yard	Yards per Sheet	Sheets per Bundle	Yards per Bundle
No. 18	21″x97″	8.00 lbs.	1½	14	21
No. 20	21″x97″	6.00 lbs.	1½	14	21
No. 22	21″x97″	5.00 lbs.	1½	14	21
No. 24	21″x97″	4.00 lbs.	1½	14	21
No. 25	21″x97″	3.50 lbs.	1½	14	21
No. 26	21″x97″	3.00 lbs.	1½	14	21

Add one pound per square yard to above weights for lath galvanized after expansion.

CECO SELF-FURRING LATH



As will be noticed from the illustration, Ceco Self-Furring Lath has a corrugation or rib running through its strands which gives it added strength and rigidity, and eliminates the necessity of furring strips. It is especially economical for use in exterior stucco work, and is manufactured almost exclusively for that purpose. It is applied directly to the sheathing boards, or studding, no furring strips being necessary, and a uniform thickness of plaster is a certainty. It is also furnished painted, galvanized after expansion, or in copper iron alloy.

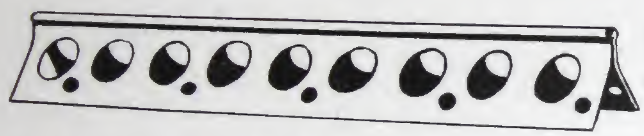
Gauge	Size of Sheet Inches	Weight per Sq. Yard	Yards per Sheet	Sheets per Bundle	Yards per Bundle
No. 24	21″x97″	4.00 lbs.	1½	14	21
No. 25	21″x97″	3.00 lbs.	1½	14	21
No. 27	21″x97″	2.80 lbs.	1½	14	21

Add one pound per square yard to above weights for lath galvanized after expansion.

CECO CRIMPED FURRING

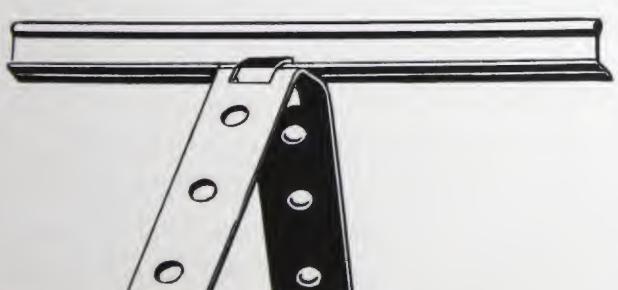
To facilitate the use of Ceco Economy or Quality Lath in exterior stucco work, we are furnishing the Ceco Crimped Furring strips for fastening the lath to the sheathing or studding. It keeps the lath away from the wall allowing room for the plaster to key. Ceco Crimped Furring comes in ½″, ¾″, or 1″ widths and lengths desired, from 9′ to 14′, packed 25 pieces per bundle, made from special analysis steel. Weight, ½″ wide, 53.2 lbs. per 1,000 linear feet; ¾″ wide, 79.8 lbs. per 1,000 linear feet, and 1″ wide, 106.4 lbs. per 1,000 linear feet.

CECO CORNER BEADS



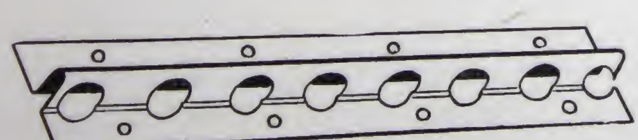
Plastered corners are easily broken and our Ceco Corner Bead here illustrated is designed to afford a steel reinforcement for the plastered corner as well as a guide for the plaster when erected. Ceco Corner Beads are made of 24 gauge steel, and being galvanized after forming, will not rust and stain the plaster. This is an exceptionally heavy bead. The round openings in the flange permit a strong keying action on the part of the plaster. Clips are furnished if desired, permitting adjustable grounds. Lengths, 6, 7, 8, 9, 10 and 12 feet. Weight, 225 lbs. per 1,000 linear feet. Shipped 10 pieces to the bundle.

CECO RAIL BEADS



Some architects and contractors prefer this type of bead which affords a substantial protection for the plaster corner. It is adjustable for any depth of grounds, one clip per foot of length being furnished. It is especially strong and heavily galvanized. Furnished in lengths 6, 7, 8, 9, 10 and 12 feet. Weight, 130 lbs. per 1,000 linear feet. Shipped 25 pieces to the bundle.

CECO BASE BEADS



This bead is extensively used to separate the cement, or composition base, from the wall plaster above. It affords a straight and sanitary joint of the two materials, preventing their contact and the absorption of moisture. It is made only for ½″ grounds, and of 24 gauge steel, heavily galvanized. The following lengths are furnished—6, 7, 8, 8′ 6″, 9, 9′ 6″, 10, 11 and 12 feet. It weighs 170 lbs. per one thousand linear feet, and is shipped 12 pieces to the bundle.

CECO COLD-ROLLED CHANNELS

Ceco Cold Rolled Channels, either plain or perforated, are used in conjunction with Ceco Metal Lath in erecting ceilings, partitions, etc., in first class fireproof structures. In comparison with the heavier hot rolled channel, you have much greater tensile strength in our cold rolled channel, weight for weight, than can be secured in the hot rolled channel. They are made from best grade open hearth steel with square shoulders and on account of the great strength and reduced weight, are much more economical than the hot rolled channel. (See details pages 26 and 27.)

PLAIN

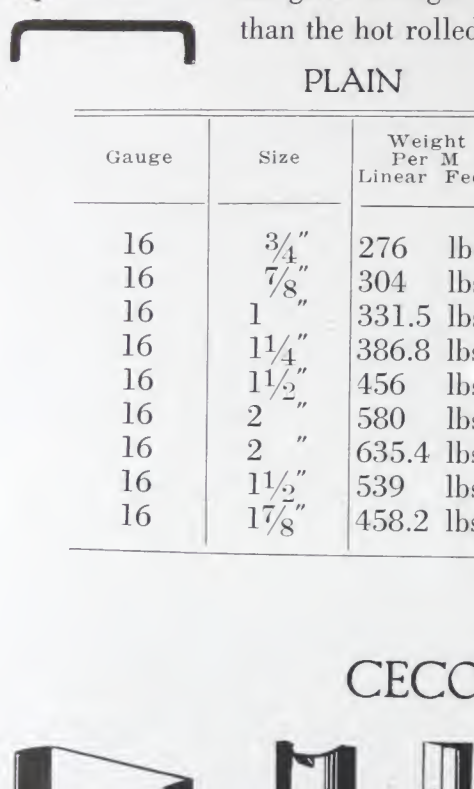
Gauge	Size	Weight Per M Linear Feet	Size of Flange
16	3/4"	276 lbs.	3/8"
16	7/8"	304 lbs.	3/8"
16	1 "	331.5 lbs.	3/8"
16	1 1/4"	386.8 lbs.	3/8"
16	1 1/2"	456 lbs.	3/8"
16	2 "	580 lbs.	3/8"
16	2 "	635.4 lbs.	1/2"
16	1 1/2"	539 lbs.	1/2"
16	1 7/8"	458.2 lbs.	1/2"

PERFORATED

Gauge	Size	Weight Per M Linear Feet	Size of Flange
16	1 1/2"	455.8 lbs.	3/8"
18	1 7/8"	458.2 lbs.	1/2"
18	2 "	479 lbs.	1/2"
18	2 1/4"	520.6 lbs.	1/2"
18	2 1/2"	562.3 lbs.	1/2"
18	3 "	645.6 lbs.	1/2"
18	3 1/2"	728.9 lbs.	1/2"

Lengths 9 to 20 feet.

CECO PRONG STUDDING



Many builders prefer the prong stud to the plain or perforated channel for use in partitions, both solid and hollow, on account of the minimum of labor required in applying the metal lath. Ceco Prong Studding is designed to meet this demand, made in two gauges, Numbers 18 and 20. As shown in the illustration, the prongs easily engage the mesh of the lath which is quickly applied by simply bending back the prongs with a hammer. Ceco Prong Studding is made with the prongs punched about every 3 1/2 inches. The double studding for hollow partitions comes in 2, 3, 4, 5 and 6 inch widths and 10 and 12 foot lengths, and the small tee studding for solid partitions comes only in 3/4 inch widths and 10 foot lengths. (See partition details on page 27.)

NOTE: Lathing accessories, namely galvanized wire ceiling hangers, cut to lengths and bent; 14 gauge, 1" staples; 18 gauge soft galvanized tie wire, etc., can also be furnished promptly from stock.

CECO EXPANDED METAL

Expanded Metal reinforcing is a thoroughly efficient reinforcement for use in the construction of concrete floors, roofs, sidewalks, roads, bridges, sewers, etc. It saves labor, assures absolutely correct placing and practically any desired sectional area of steel can be furnished. The width and thickness of the steel can be varied, so that if the sectional area of steel is specified, the required style of expanded metal can be furnished to answer the purpose. Made in convenient sizes, it is easily handled by one man and large areas quickly covered. No wiring or spacing is necessary. Made in one piece and thoroughly rigid, there is no slipping of joints. The bond with the concrete is absolute. Ceco Expanded Metal is made in the following sizes and sectional areas:

Mesh	Weight per Square Foot	Sectional Area per Square Foot	Mesh	Weight per Square Foot	Sectional Area per Square Foot
3x7 inches	.20 lbs.	.059 inches	3 x6 inches	1.40 lbs.	.413 inches
3x7 inches	.24 lbs.	.072 inches			
3x7 inches	.28 lbs.	.082 inches	2½x5 inches	.323 lbs.	.095 inches
3x7 inches	.32 lbs.	.094 inches	2½x5 inches	.430 lbs.	.127 inches
3x7 inches	.36 lbs.	.106 inches	2½x5 inches	.538 lbs.	.159 inches
3x7 inches	.42 lbs.	.124 inches	2½x5 inches	.816 lbs.	.241 inches
3x7 inches	.46 lbs.	.136 inches	2½x5 inches	.979 lbs.	.289 inches
3x7 inches	.50 lbs.	.147 inches	2½x5 inches	1.142 lbs.	.337 inches
3x7 inches	.55 lbs.	.162 inches	2½x5 inches	1.305 lbs.	.385 inches
3x7 inches	.61 lbs.	.179 inches			
3x7 inches	.79 lbs.	.232 inches			
3x7 inches	.85 lbs.	.251 inches	1½x3 inches	.333 lbs.	.098 inches
3x7 inches	.93 lbs.	.274 inches	1½x3 inches	.433 lbs.	.128 inches
3x7 inches	1.02 lbs.	.301 inches	1½x3 inches	.566 lbs.	.167 inches
3x7 inches	1.10 lbs.	.324 inches			
3x7 inches	1.19 lbs.	.351 inches	1 x2 inches	.25 lbs.	.074 inches
3x7 inches	1.28 lbs.	.377 inches	1 x2 inches	.372 lbs.	.109 inches
3x7 inches	1.36 lbs.	.401 inches	1 x2 inches	.500 lbs.	.148 inches
3x7 inches	1.44 lbs.	.425 inches	1 x2 inches	.65 lbs.	.192 inches
3x7 inches	1.53 lbs.	.451 inches	1 x2 inches	.85 lbs.	.250 inches
3x7 inches	1.61 lbs.	.475 inches			
3x7 inches	1.70 lbs.	.502 inches	¾x2 inches	.379 lbs.	.114 inches

The standard sizes of sheets are 6, 8 and 10 feet long, by 4 and 6 feet wide.

Any special size can be furnished. When giving sizes of sheets name the dimension the long way of the Diamond, first.

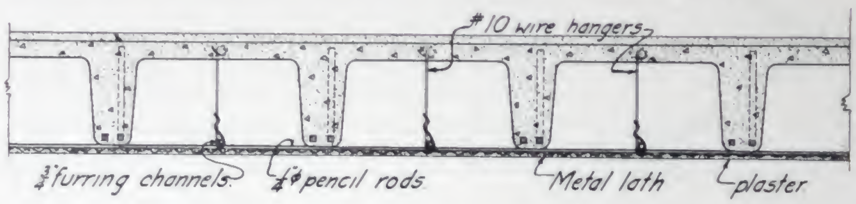
CONSTRUCTION DETAILS

Condensed Specifications

GENERAL: Ceco Metal Lath is to be applied with the long length of the sheet at right angles to all supports. Care must be exercised to apply the lath so that the twist or slant in the strands slopes down and away from the plaster side, thus preventing shearing and dropping away of the plaster. All wiring of Ceco Metal Lath is to be done with 18 gauge galvanized soft wire at intervals of at least 6". Sheets are to be lapped at least ½" at the sides and not less than 1" at the ends.

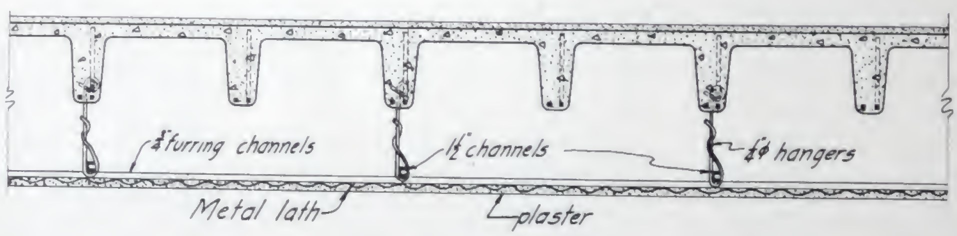
Attached Ceilings Beneath Meyer Steelform Construction

10 gauge galvanized ceiling hangers inserted in concrete slab before pouring 3'0" c-c; ¾" Ceco cold rolled channels 2'0" c-c suspended by hangers between joists, cross furred with ¼" round steel pencil rods wired to channels at 13½" c-c; —— gauge Ceco Metal Lath, painted, applied using 18 gauge soft galvanized wire. This ceiling may be suspended from joists to a distance not exceeding 6".



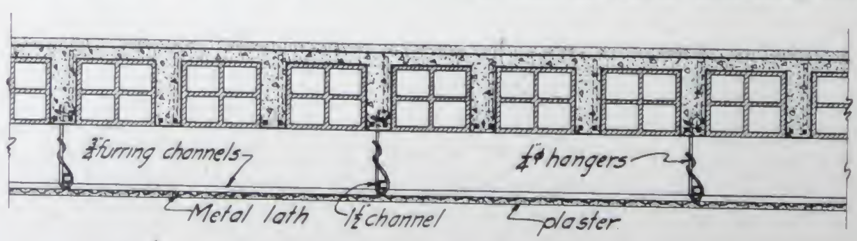
Suspended Ceilings Beneath Meyer Steelform Construction

¼" round mild steel hangers to be inserted in concrete joists before pouring through holes bored in wood centering at 4'0" c-c (both directions); 1½" Ceco cold rolled carrying channels to be suspended by hangers and cross furred with ¾" Ceco cold rolled channels 13½" c-c, tying of channels to be done with 14 gauge soft galvanized wire, and —— gauge Ceco Metal Lath, painted, to be applied using 18 gauge soft galvanized wire.



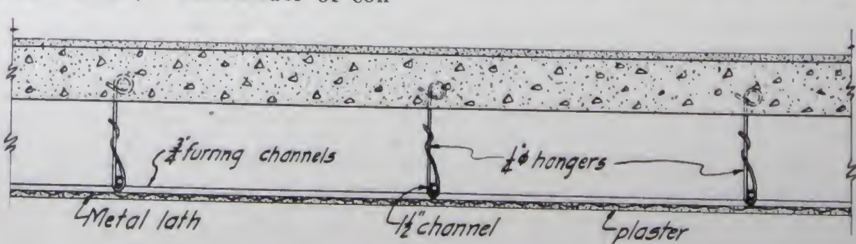
Suspended Ceilings Beneath Clay Tile Concrete Joist Construction

Specifications exactly the same as for the suspended ceiling beneath Meyer Steelform Construction.

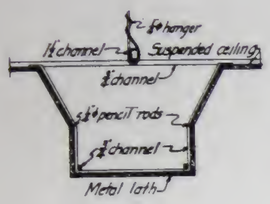


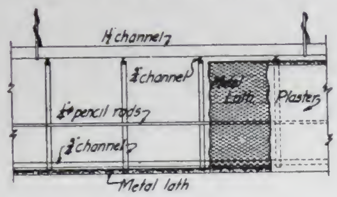
Suspended Ceilings Beneath Flat Slab Construction

¼" round mild steel hangers to be inserted in slab before pouring through holes bored in the wood centering at 4'0" c-c (both directions). Remainder of construction exactly the same as suspended ceilings beneath Meyer Steelform Construction.



Ornamental Beam (or Cornice) Furring

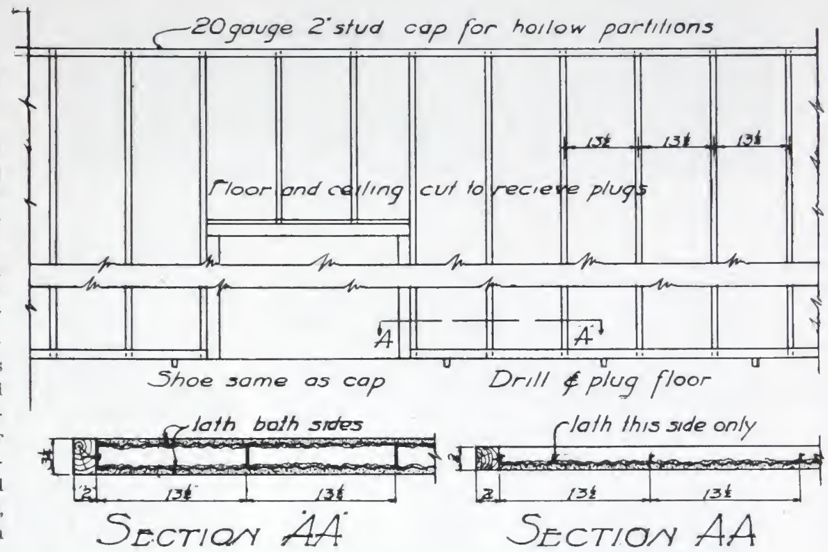




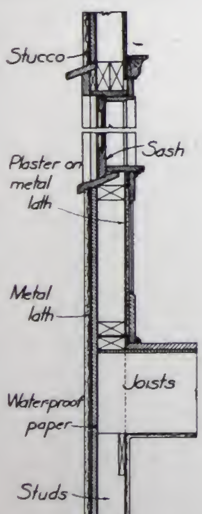
The brackets forming the outline of the beam or cornice are to be constructed of —— Ceco cold rolled channels in accordance with details furnished by the architect and spaced 16″ c-c; ¼″ round steel pencil rods or ——Ceco cold rolled channels are to be fastened to the brackets with 14 gauge galvanized tie wire, the size and spacing being dependent upon dimensions of the beam or cornice, and finished construction being capable of supporting a dead load of 60 lbs. at any point. Ceco Metal Lath is then applied, using 18 gauge galvanized wire.

Hollow and Solid Metal Lath Partitions

Hollow Partition: (single studding) Drill and plug floor and ceiling to apply channel shoe and cap to which are fastened 16 or 18 gauge Ceco plain or perforated cold rolled channels, 2″ to 3½″ in width at 13½″ c-c, lathing both sides with —— gauge Ceco Metal Lath, painted, using 18 gauge galvanized wire. NOTE: Ceco Prong Studding, in 2″ to 6″ widths, may be substituted, thereby eliminating the wiring of lath to studding. (Double Studding) Drill and plug floor and ceiling as before, using a double row of ¾″ or 1″ Ceco plain cold rolled channels (1″ channels for partition heights exceeding 14′-0″), spacing channels at such a distance as will give the required thickness of finished partition, studding to be braced at the mid-point between floor and ceiling with ¾″ or larger (depending upon thickness of partition) Ceco cold rolled channel securely wired to studding with 14 gauge galvanized wire, and Ceco Metal Lath to be applied to both sides as before.

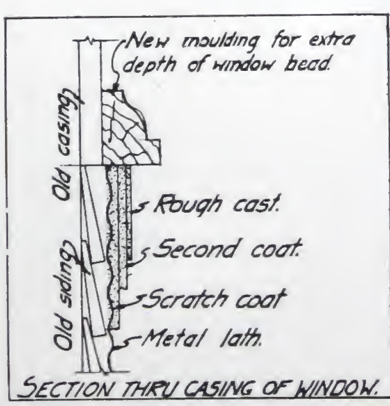


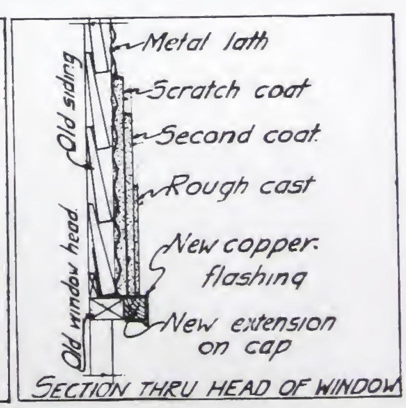
Solid Partition: Cut floor and ceiling to receive Ceco 16 gauge ¾″ cold rolled channels, spaced 13½″ c-c for partition heights up to 12′0″ and 1″ channels for greater heights, lathing one side only with —— gauge Ceco Metal Lath, painted, using 18 gauge soft galvanized wire. The ¾″ Tee Ceco Prong Stud may be used instead of plain channels. During construction, all studding is to be braced by temporary supports between floor and ceiling, until after the scratch coat of plaster has been applied.



Stucco Wall

Wood studs are to be spaced at 16″ c-c and thoroughly braced in accordance with standard practice. Sheathing boards may be omitted and Ceco Self-Furring lath applied directly to the studding and back plastered. When Ceco Economy or Quality Lath is applied to the studding or sheathing, Ceco Crimped Furring Strips must be used, being stapled with 1″ 14 gauge staples every 12″, the lath in turn being stapled every 8″, and where laps occur between supports, securely tied with 18 gauge galvanized wire. If no sheathing is used, inside face of studding must be waterproofed with tar or asphalt. If sheathing is used, a high grade weather proof paper is to be applied to inside of wall.





Overcoating

The old weather boarding may be removed, and lath applied directly to the studding or sheathing, or if the weather boarding is in good condition, Ceco Self Furring Lath, or Ceco Economy or Quality Lath with Ceco Crimped Furring Strips, may be applied to the weather boarding. The old window and door frames should be extended to correspond with the new thickness of the walls. Stapling and wiring of lath to be carried on as shown under "Stucco Wall."

High School, Tulsa, Oklahoma

John Marshall School, Chicago, Illinois

Michigan Union Bldg.,
Ann Arbor Michigan

Sheridan Hall, Hays, Kansas

Clifton Hill School, Omaha, Nebraska

Rialto Theatre, Omaha, Nebraska

Representative Buildings in which our Construction and Materials Have Been Used

SCHOOL BUILDINGS

Building	Location	Architect or Engineer
Los Feliz School	Los Angeles, Calif.	City Architect
Anne Street School	Los Angeles, Calif.	City Architect
Owensmouth High School	Owensmouth, Calif.	H. H. Hewitt, Architect
Micheltorena School	Los Angeles, Calif.	City Architect
14th Street Intermediate School	Los Angeles, Calif.	C. H. Russell, Architect
Staunton Avenue School	Los Angeles, Calif.	City Architect
Jefferson Polytechnic High School	Los Angeles, Calif.	City Architect
Watsonville High School	Watsonville, Calif.	W. H. Weeks, Architect
Cogswell School	San Francisco, Calif.	Frederick Meyer, Architect
Administration Building for University of Utah	Salt Lake City, Utah	Cannon & Fatzer, Architects
Douglas School	Salt Lake City, Utah	Francis D. Rutherford, Architect
Addition to Blaine School	Salt Lake City, Utah	Cannon & Fatzer, Architects
High School	Pocatello, Idaho	F. H. Paradice, Jr., Architect
High School	Fremont, Nebr.	A. H. Dyer Co., Architects
High School	Lincoln, Nebr.	Berlinghof & Davis, Architects
Bancroft School	Lincoln, Nebr.	Berlinghof & Davis, Architects
State Normal School	Chadron, Nebr.	James C. Stitt, Architect
Creighton University Gymnasium	Omaha, Nebr.	J. M. Nachtigall, Architect
High School	Cherokee, Iowa	Proudfoot, Bird & Rawson, Archts.
Building for Omaha University	Omaha, Nebr.	John & Alan McDonald, Architects
Gymnasium	Kearney, Nebr.	J. H. Craddock Co., Architects
Bancroft School	Omaha, Nebr.	John Latenser & Sons, Architects
School	Irwin, Iowa	W. F. Gernandt, Architect
High School	Havelock, Nebr.	W. F. Gernandt, Architect
Yates School	Omaha, Nebr.	John & Alan McDonald, Architects
Clifton Hill School	Omaha, Nebr.	F. W. & E. B. Clarke, Architects
Druid Hill School	Omaha, Nebr.	F. A. Henninger, Architect
Park School	Omaha, Nebr.	Thomas R. Kimball, Architect
Field Club School	Omaha, Nebr.	George B. Prinz, Architect
Train School	Omaha, Nebr.	Charles W. Steinbaugh, Architect
Junior High School	Hastings, Nebr.	C. W. Way Co., Architects
High School	Plattsmouth, Nebr.	George B. Berlinghof, Architect
High School	York, Nebr.	George B. Berlinghof, Architect
Grade Schools	Aurora, Nebr.	C. W. Way Co., Architects
Kearnes School	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Milton Moore School	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Bryant School	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Lowell School	Coffeyville, Kans.	C. A. Henderson, Architect
Central High School	Tulsa, Okla.	George Winkler, Architect
Sheridan Hall	Hays, Kans.	C. A. Chandler, Kansas State Archt
High School	Marlin, Texas	Fonzie E. Robertson, Architect
Grade Schools	Moberly, Mo.	Ludwig Abt, Architect
High School	Dewey, Okla.	Hawk & Parr, Architects
Liberty High School	Hutchinson, Kans.	W. E. Hulse & Co., Architects
Dormitory A. & M. College	College Station, Texas	Architectural Department of College
High School Addition	Moberly, Mo.	W. H. Sayler, Architect
School Building for Juvenile Training School	Gatesville, Texas	W. H. Clarkson, Architect
John Marshall School	Chicago, Ill.	A. F. Hussander, Architect
Garfield School	Garfield, Kans.	W. E. Hulse & Co., Architects
Nurses School	Milwaukee, Wis.	Schuchardt & Judell, Architects
Nurses Lodge	Muskegon, Mich.	H. H. Weenhoff, Architect
Michigan Union Building	Ann Arbor, Mich.	Pond & Pond, Architects
Jackson Street School	Canton, Ohio	George B. Hammond, Architect
Corlette School	Cleveland, Ohio	Architect for Board of Education
Cleveland Heights School	Cleveland, Ohio	Franz C. Warner, Architect
Willoughby High School	Willoughby, Ohio	Franz C. Warner, Architect
Central School Annex	Cleveland, Ohio	Architect for Board of Education
Western Reserve Dental College	Cleveland, Ohio	Franz C. Warner, Architect
East Technical High School	Cleveland, Ohio	Architect for Board of Education
Science and Agriculture Building	Bowling Green, Ohio	Howard & Merrian, Architects
Home Economics Building	Columbus, Ohio	Joseph N. Bradford, Architect

HOSPITALS

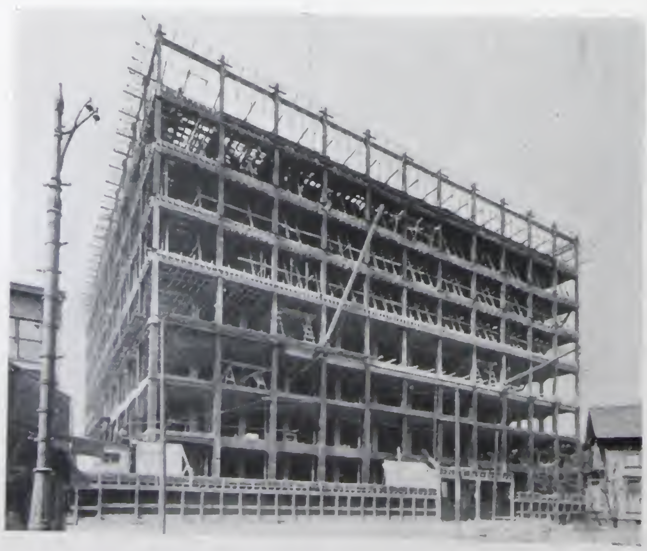
San Francisco Emergency Hospital	San Francisco, Calif.	John Reid, Jr., Architect
San Francisco City & County Hospital	San Francisco, Calif.	Herman Barth, Architect
Mt. Zion Hospital	San Francisco, Calif.	G. Albert Lansburgh, Architect
Addition to Latter Day Saints Hospital	Salt Lake City, Utah	Pope & Burton, Architects
Orthopedic Hospital	Lincoln, Nebr.	Burd F. Miller, Architect
Ford Hospital	Omaha, Nebr.	J. T. Allan, Architect
State Hospital for Insane	Norfolk, Nebr.	James C. Stitt, Architect
Methodist Hospital	Omaha, Nebr.	George B. Prinz, Architect
Atlantic Hospital	Atlantic, Iowa	Lloyd Willis, Architect
State Asylum for Feeble Minded	Glenwood, Iowa	Henry F. Liebbe, Architect
St. Anthony's Hospital Addition	Denver, Colo.	F. W. Paroth, Architect
Women's Hospital	Saginaw, Mich.	Cowles & Mutscheller, Architects
Columbia Hospital	Milwaukee, Wis.	Schmidt, Garden & Martin, Archts.
Children's Mercy Hospital	Kansas City, Mo.	Wight & Wight, Architects
Henry Ford Hospital	Detroit, Mich.	Architectural Department of Hospital

Security Mutual Building,
Lincoln, Nebraska

Wieboldt Department Store, Chicago, Illinois

Omaha Grain Exchange, Omaha, Nebraska

Miller & Paine Stores, Lincoln, Nebraska



Michigan State Telephone Co. Bldg., Detroit, Michigan

Exchange National Bank, Tulsa, Oklahoma

OFFICE AND STORE BUILDINGS

Building	Location	Architect or Engineer
Merchants National Bank Building	Los Angeles, Calif.	William Curlette & Son, Architects
Kerckhoff Building	Los Angeles, Calif.	Morgan, Walls & Morgan, Architects
Stability Building	Los Angeles, Calif.	Albert Martin, Architect
M. J. Connell Building	Los Angeles, Calif.	George W. Harding, Engineer
Southern Title Guaranty Building	San Diego, Calif.	Theodore C. Kistner, Architest
Olender Building	Fresno, Calif.	Eugene Mathewson, Architect
Grangers Building	Hollister, Calif.	William Binder, Architect
Twohy Building	San Jose, Calif.	William Binder, Architect
Addition to Standard Oil Building	San Francisco, Calif.	P. J. Walker Co., Architects
Addition to Fife Building	San Francisco, Calif.	Sylvain Schnaittacher, Architect
Addition to Emporium Building	San Francisco, Calif.	Morris M. Bruce, Architect
Northwestern Pacific Building	San Francisco, Calif.	O'Brien Bros., Architects
McCreery Estate Building	San Francisco, Calif.	Willis Polk Co., Architects
Colonel Hudson Building	Ogden, Utah	Shreeve & Madsen, Architects
First National Bank Building	Pocatello, Idaho	
Firestone Tire & Rubber Company Building	Omaha, Nebr.	John Latenser & Sons, Architects
Omaha Grain Exchange Building	Omaha, Nebr.	F. A. Henninger, Architect
Securities Building	Omaha, Nebr.	F. A. Henninger, Architect
Miller & Paine Store Buildings	Lincoln, Nebr.	Berlinghof & Davis, Architects
Security Mutual Life Building	Lincoln, Nebr.	Berlinghof & Davis, Architects
Rudge & Guenzel Store Building	Lincoln, Nebr.	G. H. Ellsworth, Architect
Oil Exchange Building	Casper, Wyo.	Garbutt & Weidner, Architects
Hynds Building	Cheyenne, Wyo.	William Dubois, Architect
Francis Building	Des Moines, Iowa	Sawyer & Watrous, Architects
Martin Building	Sioux City, Iowa	Beuttler & Arnold, Architects
Park Store Building	Storm Lake, Iowa	Marten & Sutherland, Architects
Marten Store Building	Storm Lake, Iowa	Marten & Sutherland, Architects
Flannigan-Sewage Realty Company Building	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Ridge Arcade Building	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Firestone Tire & Rubber Company Building	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
John Doherty Building	Kansas City, Mo.	E. P. Madorie, Architect
Railway Exchange Building	Kansas City, Mo.	Wight & Wight, Architects
Tharp Wallace Building	Blackwell, Okla.	Crowell & Van Meter, Architects
Exchange National Bank	Tulsa, Okla	Weary & Alford, Architects
Gustin Bacon Service Station	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Wittman Building	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Wirthman Store, Office and Theatre Building	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Oklahoma Producing & Refining Company Building	Tulsa, Okla.	C. K. Birdsall,, Architect
Central Trust Building	Rock Island, Ill.	Frank A. Carpenter, Architect
Freeport State Bank	Freeport, Ill.	Frank A. Carpenter, Architect
Weiboldt Department Store	Chicago, Ill.	R. C. Berlin, Architect
Michigan State Telephone Company Building	Detroit, Mich.	Smith, Hinchman & Grylls, Archts.
Rayner-Dalheim Building	Chicago, Ill.	T. R. Bishop, Architect
Laird-Norton Building	Winona, Minn.	Schmidt, Garden & Martin, Archts.
May Building	Cleveland, Ohio	Graham Burnham & Co., Architects
Marshall Building	Cleveland, Ohio	W. S. Lougee, Architect
Heller Brothers Building	Cleveland, Ohio	Christian Schwarzenberg & Gaede, Architects
Baruch Mahler Commercial Building	Cleveland, Ohio	Richardson & Yost, Architects
Skeel Hall	Cleveland, Ohio	Frank D. Skeel, Architect

HOTELS AND APARTMENTS

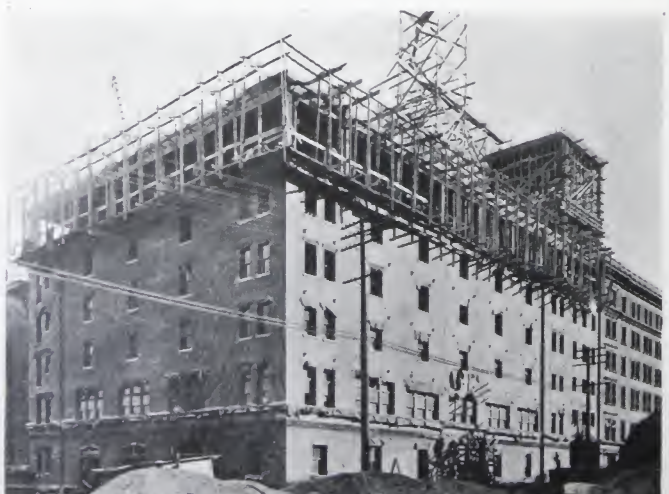
Morshead Apartment	San Francisco, Calif.	Houghton Sawyer, Architect
Wilson Apartment	San Francisco, Calif.	C. A. Meussdorffer, Architect
Alice Apartments	Omaha, Nebr.	F. A. Henninger, Architect
Castle Hotel	Omaha, Nebr.	John McDonald, Architect
Morris Apartments	Omaha, Nebr.	James T. Allan, Architect
Clarke Hotel	Hastings, Nebr.	C. W. Way Co., Architects
Drake Apartments (eight buildings)	Omaha, Nebr.	Drake Realty Construction Co., Architects
St. Regis Apartments	Omaha, Nebr.	Bankers Realty Investment Co., Architects
Blackstone Hotel	Omaha, Nebr.	Bankers Realty Investment Co., Architects
Elwood Apartments	Omaha, Nebr.	Drake Realty Construction Co., Architects
Hotel Conant	Omaha, Nebr.	John & Alan McDonald, Architects
Coronado Apartments	Omaha, Nebr.	Drake Realty Construction Co., Architects
Kingsborough Apartments	Omaha, Nebr.	Fred Nelson, Architect
Hotel	Grand Island, Nebr.	Bankers Realty Investment Co., Architects
Hotel	Kearney, Nebr.	Bankers Realty Investment Co., Architects
Hotel	Scottsbluff, Nebr.	Bankers Realty Investment Co., Architects
Home Builders Apartments	Omaha, Nebr.	James T. Allan, Architect
Hotel	York, Nebr.	F. W. & E. B. Clarke, Architects
Midwest Hotel	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Oldham Hotel	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Garden Apartments	Chicago, Ill.	Schmidt, Garden & Martin, Archts.
Bancroft Hotel	Saginaw, Mich.	Schmidt, Garden & Martin, Archts.
Parkway Apartment	Chicago, Ill.	R. C. Berlin, Architect
Smith Apartments	Chicago, Ill.	L. G. Hallberg & Co., Architects
Swanson Apartment	Chicago, Ill.	Andrew Sandergren, Architect
Dr. G. W. Crile Hotel	Cleveland, Ohio	Frank D. Skeel, Architect

U. S. Garage, San Francisco, California

Hudson Stuyvesant Building,
Cleveland, Ohio

Rayner-Dalheim Bldg., Chicago, Illinois

Sample-Hart Garage, Omaha, Nebraska



Lee-Coit-Andreeson Co. Warehouse,
Omaha, Nebraska

Firestone Tire & Rubber Co. Building,
Kansas City, Missouri

GARAGES

Building	Location	Architect or Engineer
Babbitt Garage	Flagstaff, Ariz.	George W. Harding, Engineer
Liberty Garage	San Francisco, Calif.	T. Patterson Ross, Architect
Bigelow Garage	San Francisco, Calif.	August Headman, Architect
St. George Garage	San Francisco, Calif.	O'Brien Brothers, Architects
Powell Street Garage	San Francisco, Calif.	W. H. Toepke, Architect
Podesta Garage	San Francisco, Calif.	Perseo Righetti, Architect
Cameron Garage	Omaha, Nebr.	John McDonald, Architect
Hiatt Realty Company Building	Omaha, Nebr.	James T. Allan, Architect
Service Garage	Omaha, Nebr.	J. P. Guth, Architect
West Farnam Garage	Omaha, Nebr.	Geo. B. Prinz, Architect
Sample Hart Garage	Omaha, Nebr.	James T. Allan, Architect
Scott Garage	Omaha, Nebr.	F. A. Henninger, Architect
Blacktone Garage	Omaha, Nebr.	Bankers Realty Investment Co., Architects
Sunderland Bros. Garage	Omaha, Nebr.	John & Alan McDonald, Architects
Freeman Garage	Lincoln, Nebr.	C. H. Larsen, Architect
Smith-Dorsey Building	Lincoln, Nebr.	C H. Larsen, Architect
Strode Garage	Lincoln, Nebr.	Fiske & Meginnis, Architects
Du Teil Garage	Lincoln, Nebr.	Jesse B. Miller, Architect
Zimmerer Garage	Seward, Nebr.	Grabe & Helleberg, Architects
Kasparek Garage	Davis City, Nebr.	R. A. Bradley & Co., Architects
Kerr Estate Garage	Hastings, Nebr.	C. W. Way Co., Architects
Brandeis Garage	Hastings, Nebr.	F. A. Henninger, Architect
T H. Pollock Co. Garage	Plattsmouth, Nebr.	George A. Berlinghof, Architect
Mills County Garage	Glenwood, Iowa	J. Chris Jensen, Architect
Romans Garage	Denison, Iowa	M. P. Renfro, Architect
Ficke Garage	Davenport, Iowa	Clausen & Kruse, Architects
Iles & Weir Garage	Davenport, Iowa	Clausen & Kruse, Architects
Knoche Garage	Kansas City, Mo.	E. O. Brostrum, Architect
McQueenie Garage	Kansas City, Mo.	S. R. Frink, Architect
Martin Auto Sales Building	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Carhart Motor Company Building	Oklahoma City, Okla.	Layton & Smith, Architects
McClelland-Gentry Motor Company Building	Oklahoma City, Okla.	Layton & Smith, Architects
Mathis Garage	Tampico, Ill	Clausen & Kruse, Architects
Skeel Bros. Garage	Cleveland, Ohio.	Frank D. Skeel, Architect
Hudson Stuyvesant Building	Cleveland, Ohio	Skeel Bros, Architects
Adams Oakland Building	Cleveland, Ohio	The Building Service Co., Architects
Building for Cooke Realty & Investment Co.	Cleveland, Ohio	Lehman & Schmitt, Architects
Boyer Bros. Building	Akron, Ohio	Boyer Bros., Architects

WAREHOUSES AND FACTORIES

Building	Location	Architect or Engineer
Diamond Laundry Co Building	Los Angeles, Calif.	Train & Williams, Architects
Crescent Creamery Co.	Los Angeles, Calif.	George W. Harding, Engineer
Douglas Printing Co. Building	Omaha, Nebr.	James T. Allan, Architect
Shafer Printing Co. Building	Omaha, Nebr.	John & Alan McDonald, Architects
Gordon-Lawless Building	Omaha, Nebr.	Lloyd Willis, Architect
Star Van & Storage Co. Building	Lincoln, Nebr.	C. H. Larsen, Architect
Petersen-Pegau Bakery	Omaha, Nebr.	C. D. Cooley Co., Architects
Graham Ice Cream Co. Office and Factory	Omaha, Nebr.	Richard Everett, Architect
Lee-Coit-Andreesen Co. Warehouse	Omaha, Nebr.	Henry Raapke, Architect
Douglas Motors Corporation, Office and Factory	Omaha, Nebr.	O. H. Strauser Co., Contractors
Firestone Tire & Rubber Co Bldg.	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Cook Paint & Varnish Co. Bldg.	Kansas City, Mo.	Smith, Rea & Lovitt, Architects
Mid. Cont. Tire & Rubber Co. Bldg.	Wichita, Kans.	Smith, Rea & Lovitt, Architects
Williamson Halsell Frasier Co. Warehouse	Oklahoma City, Okla.	Layton & Smith, Architects
Liberty Dairy Building	Chicago, Ill.	A. L. Himelblau, Architect
C. & N W. Calumet Elevator Bldg.	Chicago, Ill.	Witherspoon-Engler Co., Contractors
John Becker Building	Cleveland, Ohio	Charles E. Tousley, Architect
Van Dorn Electric Co. Building	Cleveland, Ohio	William J. Carter, Architect
Atlas Car & Manufacturing Co. Bldg.	Cleveland, Ohio	W. S. Ferguson Co., Architects

OTHER BUILDINGS

Building	Location	Architect or Engineer
Municipal Pier	Redondo Beach, Calif.	George W. Harding, Engineer
Memorial Art Gallery	Palo Alto, Calif.	Bakewell & Brown, Architects
Omaha Athletic Club	Omaha, Nebr.	John Latenser & Sons, Architects
Old Peoples Home	Omaha, Nebr.	John McDonald, Architect
House of Good Sheperd	Omaha, Nebr.	John Latenser & Sons, Architects
Rialto Theatre	Omaha, Nebr.	John Latenser & Sons, Architects
Des Moines Municipal Court House	Des Moines, Iowa	Associate Architects of Des Moines
Dodge County Court House	Fremont, Nebr	A. H. Dyer Co., Architects
Clay County Court House	Clay Center, Nebr.	W. F. Gernandt, Architects
Masonic Temple	Lincoln, Nebr.	Berlinghof & Davis, Achitects
Auditorium	Kearney, Nebr.	J. H. Craddock Co., Architects
Swope Park Music Pavilion	Kansas City, Mo.	City Hall Architect
Nettleton Home	Kansas City, Mo.	Wight & Wight, Architects
Pawnee County Court House	Larned, Kans.	W. E. Hulse & Co., Architects
Kansas Masonic Home	Wichita, Kans.	Edward L. Tilton, Architect
Elks Club	Chicago, Ill.	Ottenheimer, Stern & Reichert, Architects
Eleanor Club	Chicago, Ill.	Schmidt, Garden & Martin, Archts.
Dairy Barn Building	Mooseheart, Ill.	Robert F. Havlik, Architect
Girl's Dormitory	Mooseheart, Ill.	Robert F. Havlik, Architect
Printing Building	Mooseheart, Ill.	Robert F. Havlik, Architect
Dormitory 54	Mooseheart, Ill.	Robert F. Havlik, Architect
Dormitory 55	Mooseheart, Ill.	Robert F. Havlik, Architect
East Legion Hall	Mooseheart, Ill.	Robert F. Havlik, Architect
Esther J. Davis Hall	Mooseheart, Ill.	Robert F. Havlik, Architect
Industrial Building	Mooseheart, Ill.	Robert F. Havlik, Architect
Ladies of Maccabees Building	Port Huron, Mich.	Schmidt, Garden & Martin, Archts.
H. H. Timken Residence	Canton, Ohio	Mr. Gilchrist, Architect
Corning Residence	Cleveland, Ohio	Meade & Hamilton, Architects

Blackstone Hotel, Omaha, Nebraska

Garden Apartments, Chicago, Illinois

Oldham Hotel, Kansas City, Missouri

Smith Apartments, Chicago, Illinois

Hotel, Grand Island, Nebraska

Swanson Apartments, Chicago, Illinois

Elks Club, Chicago, Illinois

Parkway Apartments, Chicago, Illinois

Nettleton Home, Kansas City, Missouri

Freeport State Bank,
Freeport, Illinois

Rice Building, Boston Massachusetts

Municipal Pier, Redondo Beach, California

Eleanor Club, Chicago, Illinois

Mercy Hospital, Kansas City, Missouri

San Francisco Hospital, San Francisco, California

Athletic Club, Omaha, Nebraska

Henry Ford Hospital, Detroit, Michigan

Morshead Apartments, San Francisco, California

Christiansen Bldg., Chicago, Illinois

Fort Shelby Hotel, Detroit, Michigan

Columbia Hospital,
Milwaukee, Wisconsin

Dodge County Court House, Fremont, Nebraska

Conant Hotel, Omaha, Nebraska

14th Street School, Los Angeles, California

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